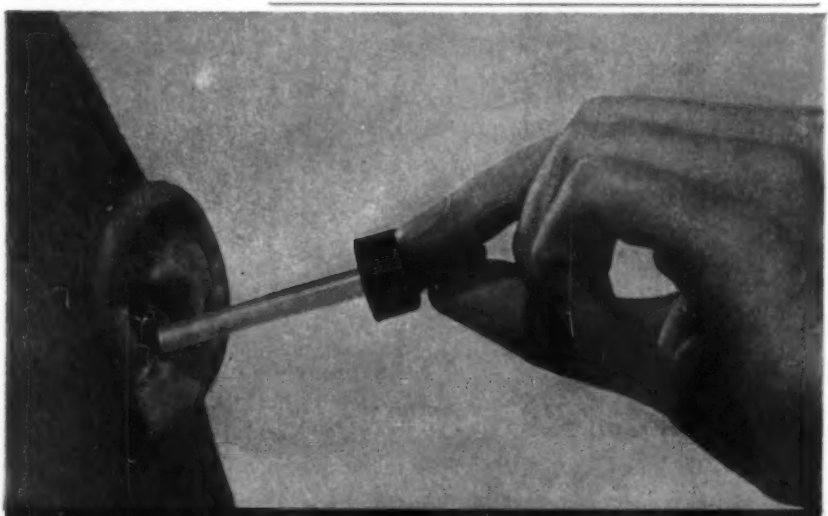
November 1958
JPH
VOLUME 48 NUMBER 11

AMERICAN Journal of Public Health AND THE NATION'S HEALTH

FOR EASY, SAFE AND PAINLESS REMOVAL OF EAR WAX—WITHOUT INSTRUMENTATION



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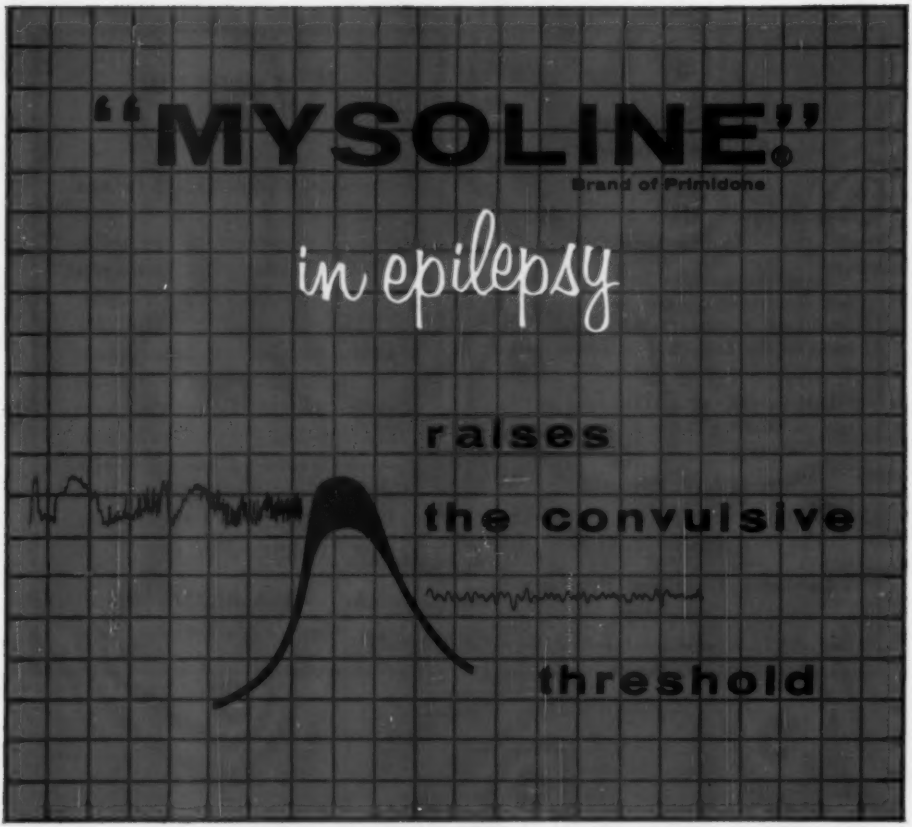

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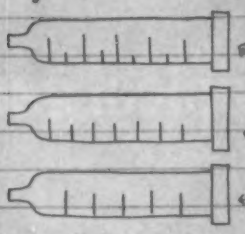

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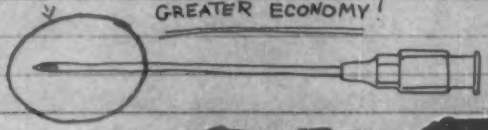

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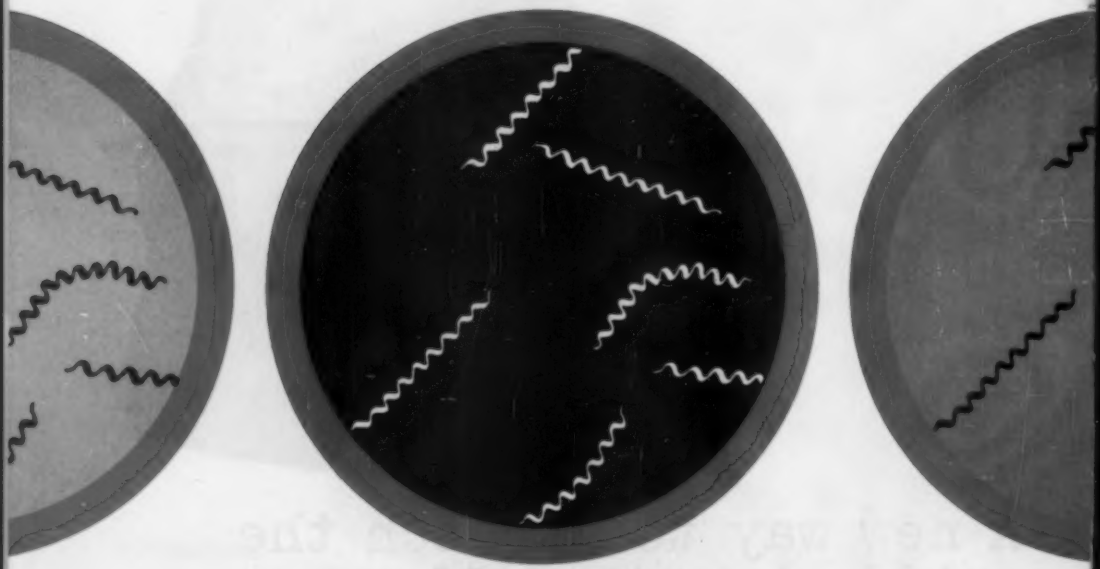

PROGRESS IN SERODIAGNOSIS OF SYPHILIS

The usefulness of any diagnostic procedure is measured by two values—specificity and sensitivity. Serologic tests for syphilis (Kahn, Kline, Mazzini, VDRL, Kolmer, Wasserman) use nonspecific antigens, that is, antigens not derived from the causative organism, *Treponema pallidum*. Therefore they lack the specificity and sensitivity necessary to be diagnostically reliable. False-positive reactions are sometimes obtained with nonsyphilitic serums, and they may also err on the negative side.

In 1951, the first definitive test using live *Treponema pallidum*, the Treponema Pallidum Immobilization (TPI) test, was developed. The Treponema Pallidum Immune Adherence (TPIA), Treponema Pallidum Agglutination (TPA) and Treponema Pallidum Complement Fixation (TPCF) tests followed. These treponemal tests are sensitive and highly specific, almost eliminating false-positive reactions.

However, there are disadvantages. Preparation of antigen is difficult and very costly—*Treponema pallidum* can be grown appreciably only in living tissue. Treponemal tests are time-consuming and difficult to perform. In addition, preparation of antigen involves risk of infection with a virulent organism. Therefore, treponemal tests are performed only in specialized laboratories.

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*Cannefax, G. R., and Garson, W.: Pub. Health Rep. *72*:335, 1957.

SENSITIVITY IN SERODIAGNOSIS OF SYPHILIS

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NO CHANGEOVER	the RPCF Antigen is used in existing complement fixation techniques
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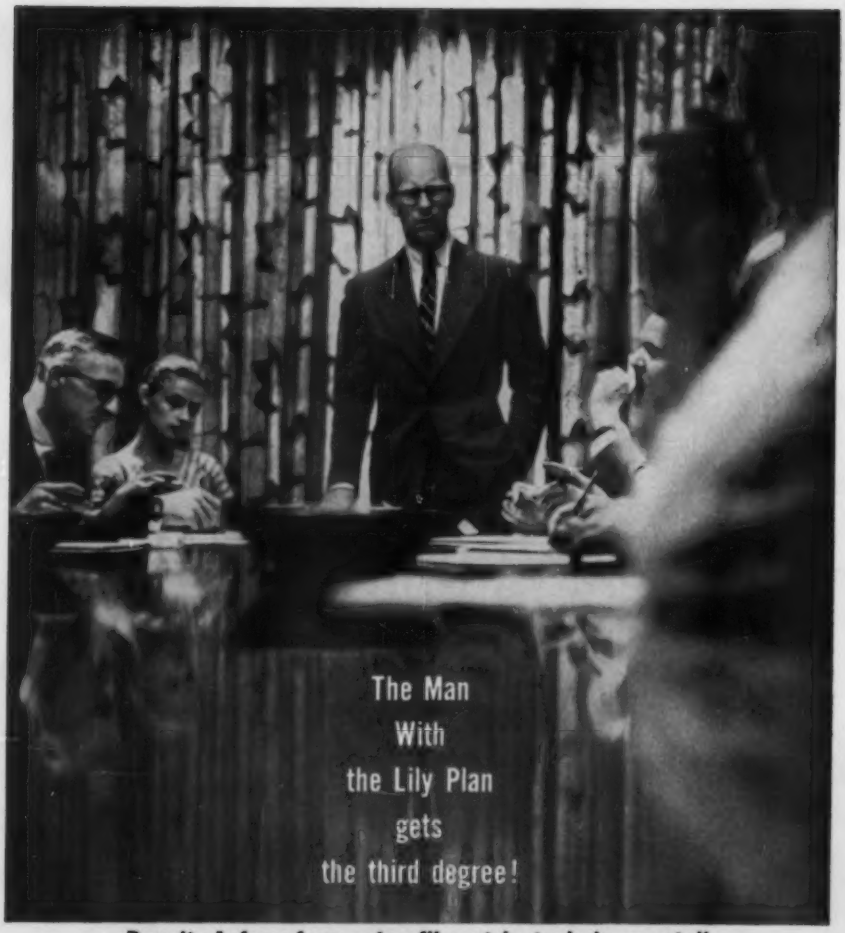

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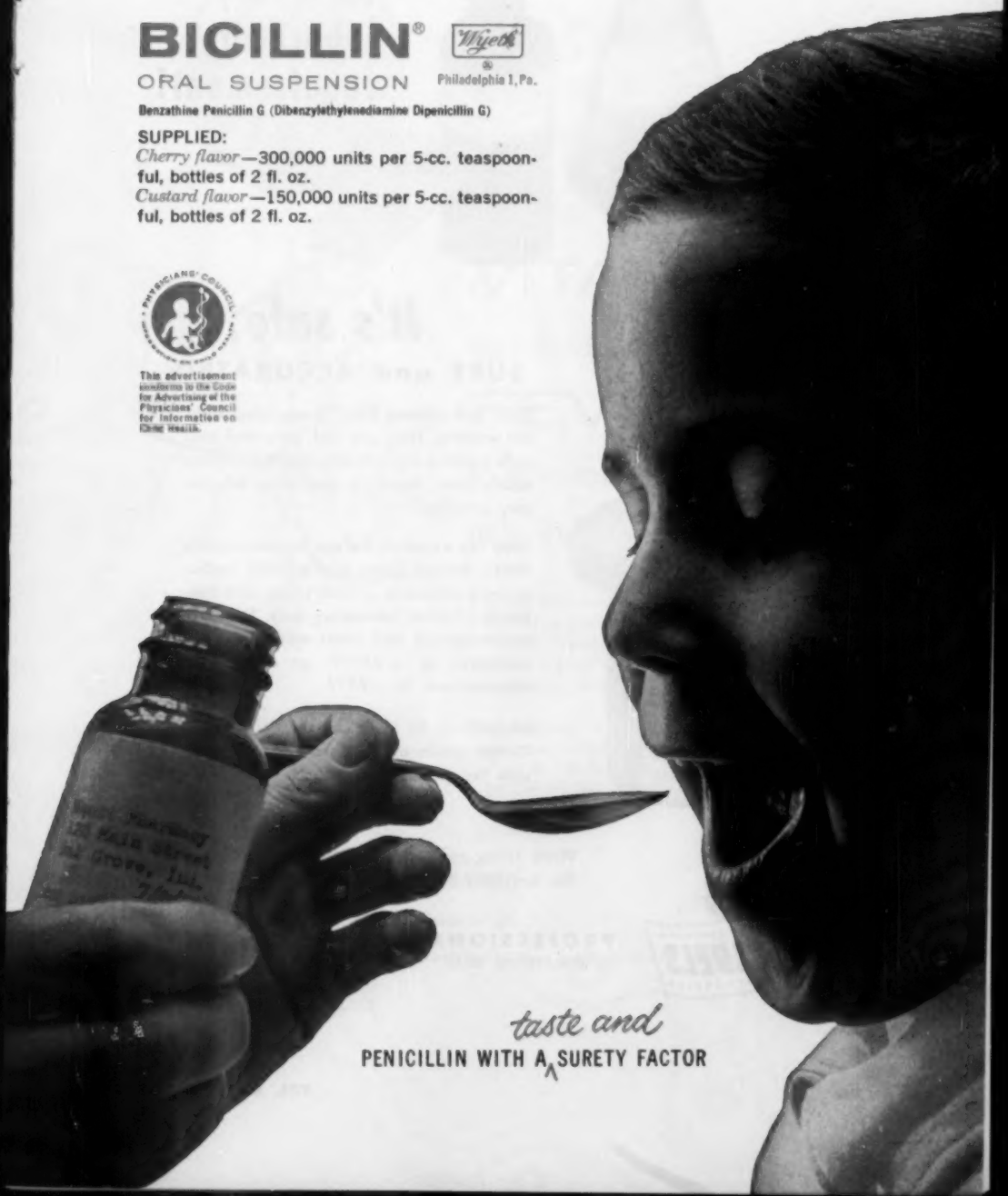

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– In: Clinical Nutrition ed. by Norman Jolliffe et al. New York, Paul B. Hoeber, Inc., 1950, pp. 590-91, 637-38.

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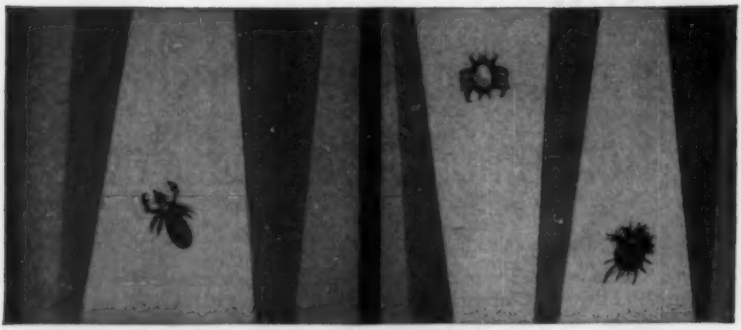

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Gardner, J.: J. Pediat. 52:448 (Apr.) 1958.

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1. J. Lab. & Clin. Med., *45*:679, 1955.
2. Bull. World Health Organ., *10*:823, 1954.

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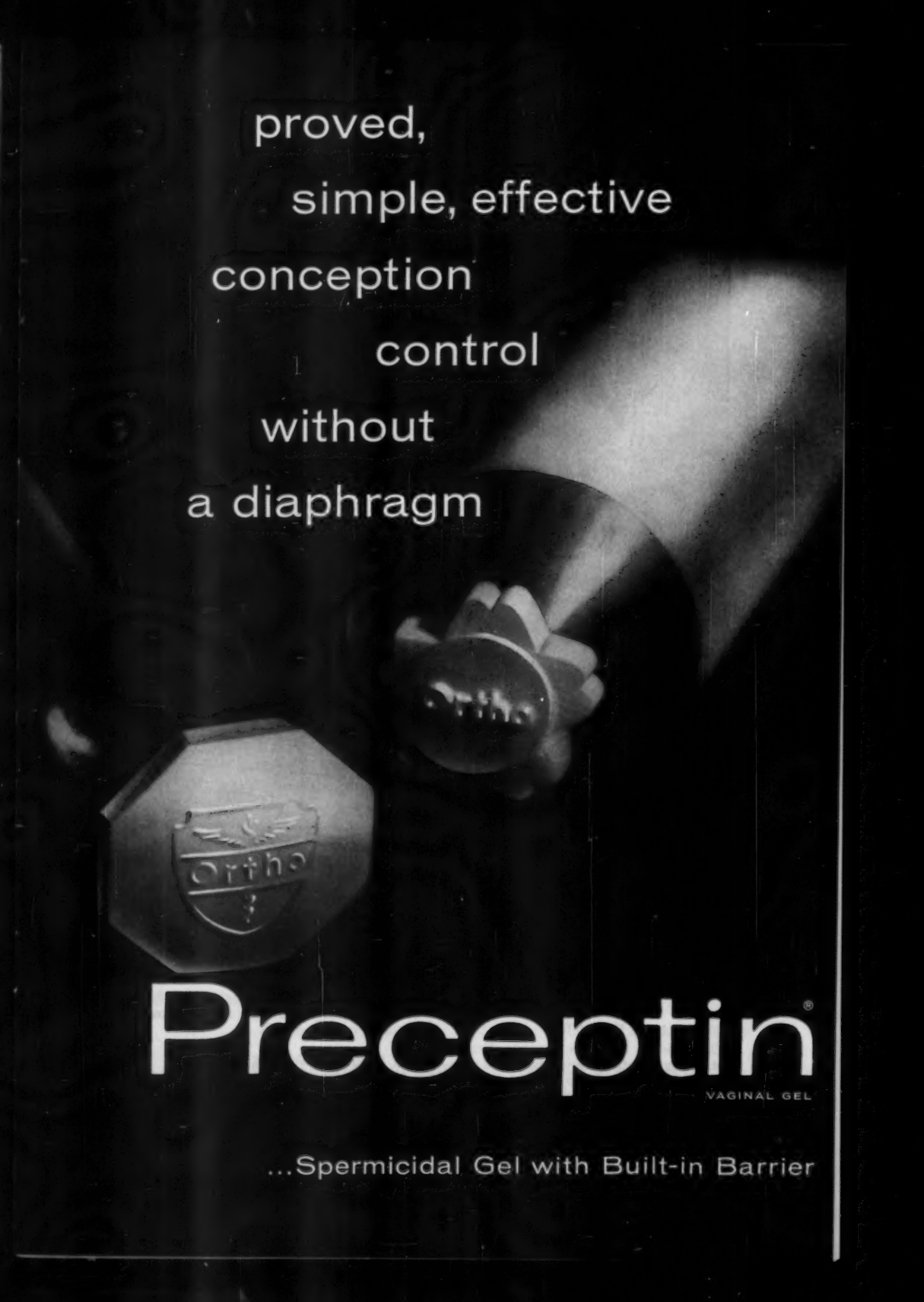
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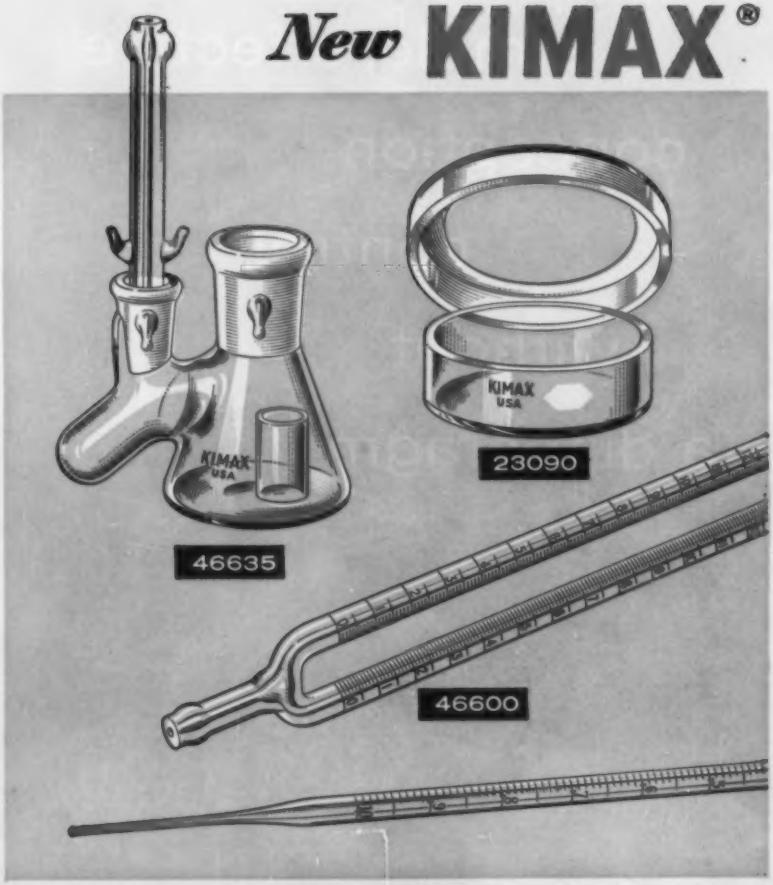

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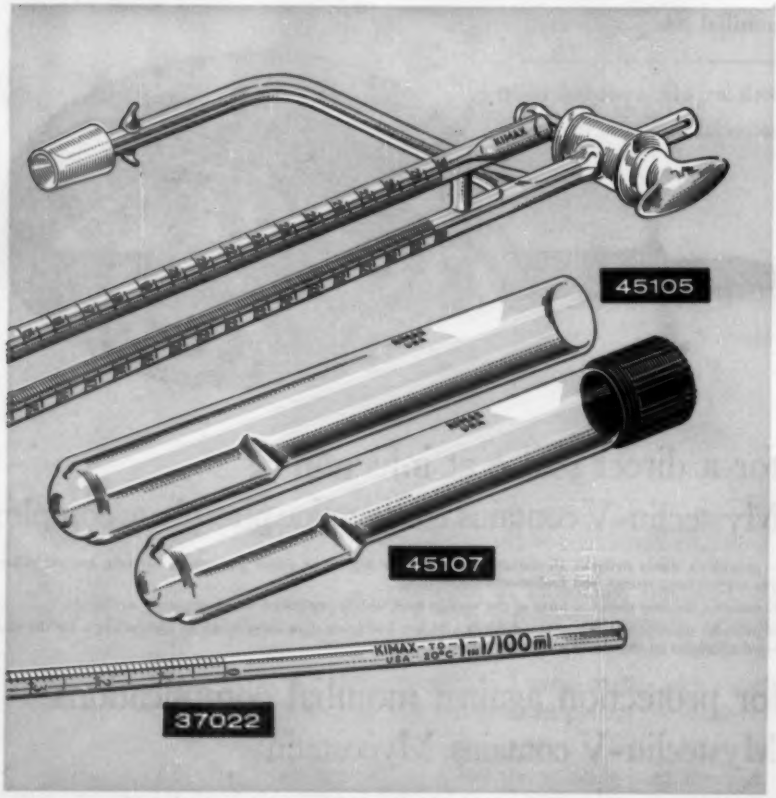

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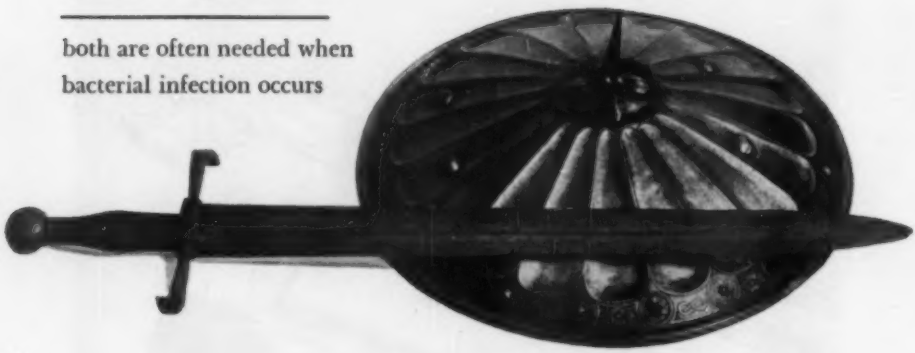

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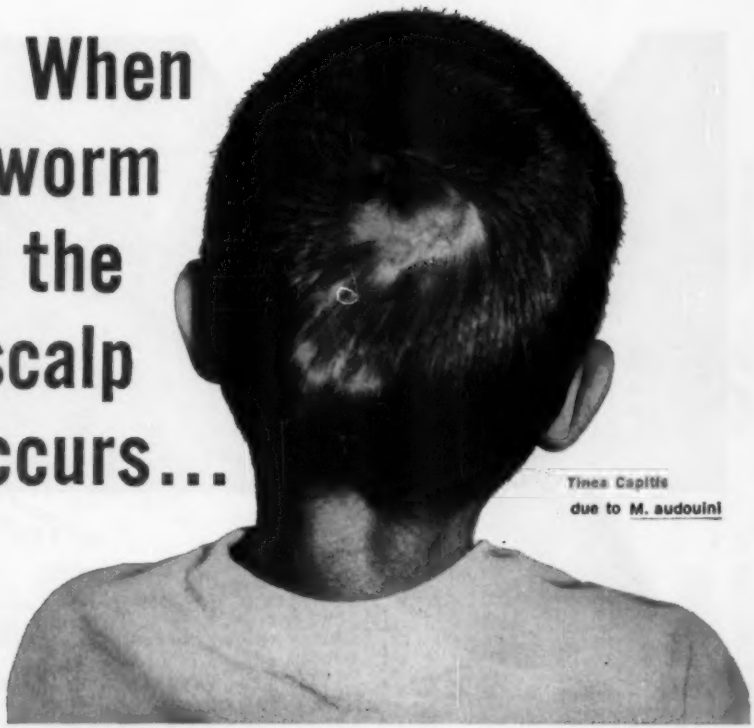

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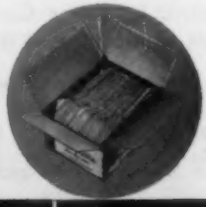

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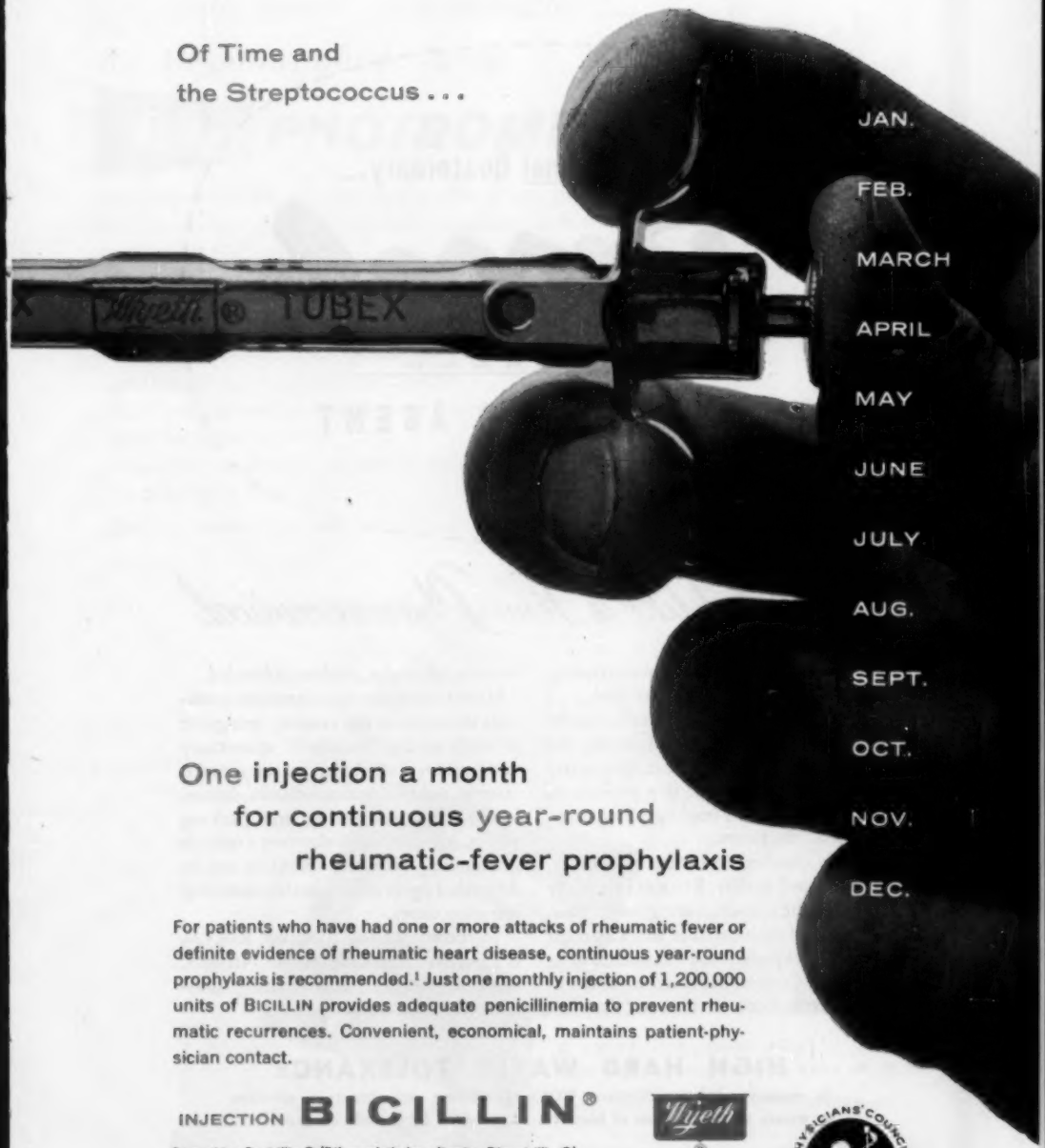

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1. American Heart Association: Committee on Prevention of Rheumatic Fever and Bacterial Endocarditis: Circulation 15:154 (Jan.) 1957.

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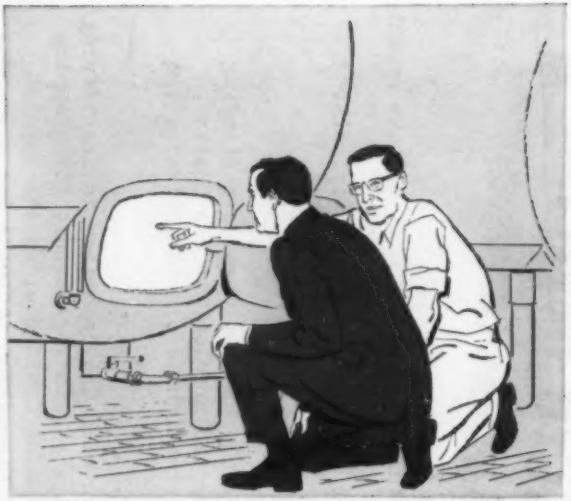

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Journal of Public Health

The decline of tuberculosis has attracted attention to the epidemiology of a retreating disease. Opinions vary as to the situation that will develop over the next few decades. Dr. Dublin reviews the problem, offers an optimistic estimate of future developments, and points to the means by which the retreat of tuberculosis can be still further accelerated.

THE COURSE OF TUBERCULOSIS MORTALITY AND MORBIDITY IN THE UNITED STATES

Louis I. Dublin, Ph.D., F.A.P.H.A.

THE COURSE OF mortality and morbidity from tuberculosis illustrates strikingly the changes which have taken place in the health of the United States and of the Western World in the past fifty years. In the earlier years of the century, tuberculosis was the leading cause of death, with rates of the order of 200 per 100,000. Some areas and racial groups had rates considerably higher. As for morbidity, clinicians have generally agreed, despite the lack of reliable data, that tuberculosis was extremely widespread and that infection reached close to 100 per cent of the population at the older ages. In any case, the disease was regarded by social workers as the first cause of family breakdown. Its designation, "the white plague," was a fair indication of the high prevalence of and the extreme damage caused by the disease.

How different is the picture today! The death rate in the United States is down to below 8 per 100,000, or about 96 per cent below that of the year 1900. Recent mortality figures for Denmark and the Netherlands are even lower, 6.3 and 6.7 per 100,000, respectively. Infection and morbidity rates have not been reduced as much, but they, too, are very much lower than the earlier figures. The infection rate is now of the order of 30 per cent at all ages combined and well below 5 per cent at the early ages of life. So great has been the reduction in the number of cases under care in recent years that the questions have been seriously raised by official agencies and by competent students of the subject as to when tuberculosis may become, like other formerly important diseases such as diphtheria and typhoid fever, of little health significance in our country and

how soon it will move on the road to eradication.

It is important to point out, however, that this comforting picture for our country and a few other advanced-health areas is far from universal. Large parts of the world, including China, India, and the Middle Eastern countries, where more than one-half of the world's population lives, are still suffering a high prevalence of and mortality from tuberculosis. Conditions there recall the situation here about fifty years ago. But even in these countries marked progress is being made. The recent decline throughout the world and the huge success of the campaign in the West clearly suggest that ultimate conquest of the disease may be looked forward to with confidence.

I propose in this paper to review the course of tuberculosis during the past fifty years; to consider briefly some of the factors that have been involved; to show the current impact on the several age, sex and race groups of the population; and, finally, I shall attempt to forecast the course of the disease in the immediate future.

Chart 1 presents the crude death rates in the United States from 1900 to 1957. In the early years the figures covered the so-called death registration states; since 1933 they are for the entire country. The point to observe is the continuous decline since 1900. There has never been any doubt as to the direction of the death rate during this long period. In the first two decades, the average annual rates of decline were 2.1 and 2.7 per cent, respectively. In the third decade, the rate of decline increased to an average of 3.7 per cent annually. This was maintained at about the same level in the decade 1930–1940. A marked change then occurred. In the period 1940–1950, the average annual rate of decline increased to 5.1 per cent

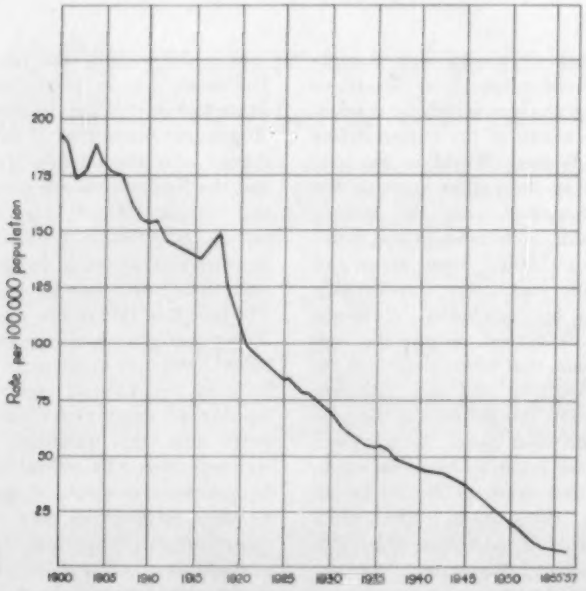

Chart 1—Tuberculosis Death Rates, United States, 1900–1957

and in the past seven years the average decline has been nearly 7 per cent per annum. Currently the declines have been of the order of 10 per cent a year. There has thus been a marked acceleration in the rate of decline instead of a deceleration, which has been the usual phenomenon with other declining diseases. A powerful new force has obviously been at work in recent years, and this we shall consider more fully later.

The analysis which follows is based on data collected by the National Office of Vital Statistics and on a comprehensive series of tables and charts on the tuberculosis problem prepared by the Division of Special Health Services of the U. S. Public Health Service.

The death rates among males and females during this period followed a similar course. The rates for females have been uniformly lower than for males and in recent years have declined more rapidly, reaching the extremely low figure of about 5 per 100,000 in 1956, the last year available.

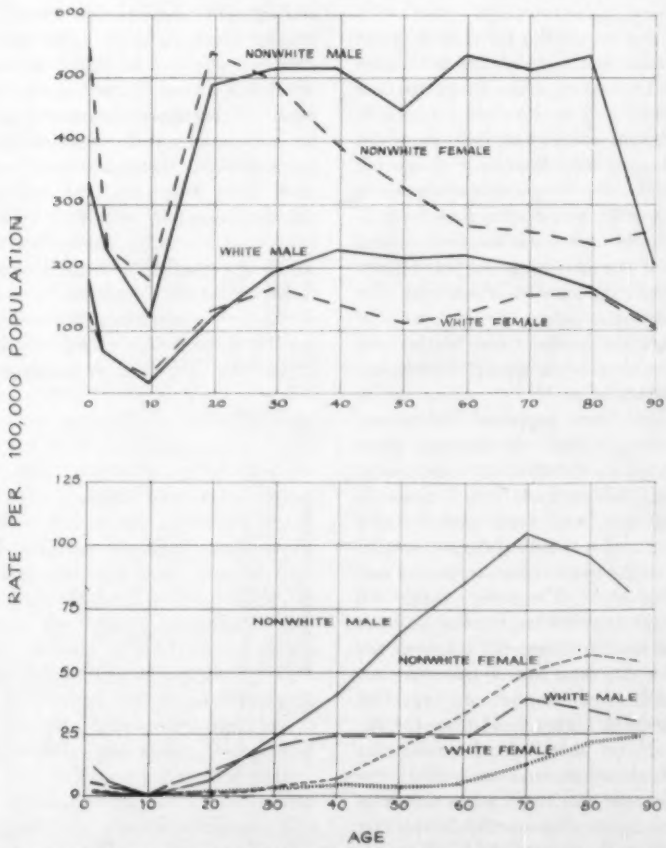

Chart 2—Death Rates for Tuberculosis, All Forms, Death Registration States, 1914 and 1955

Source: National Office of Vital Statistics

The rates for whites and nonwhites parallel those for the entire population. In this comparison we are struck with the extraordinary gains made by the nonwhites. In the early decades their rates were in excess of 400 per 100,000 and in some areas much higher. Although their death rate is still more than twice that of the whites, the rate of the decline which they register each year is considerably greater than for the white race. All of which confirms the prevailing optimism that the gains are being registered throughout the population.

Chart 2 presents the age-specific rates of mortality for each of the two sexes and the two races early in the period under study and at the close. In 1914, the death rate was highest in infancy, declined sharply to a minimum at age 10, rose rapidly to a new maximum between ages 30 and 40, and declined moderately among males and much more so among females at the older ages. The figures for nonwhites parallel those for the whites, but at a much higher level. In both races the higher rates for females at the younger adult ages received considerable attention in the earlier literature. This was supposed to reflect, among other things, the hazards from tuberculosis incidental to pregnancy. Currently, the marked irregularities in rates by age have been pretty much wiped out and a totally different pattern appears in the curves of mortality by sex, color, and age. The rates of the two sexes among the whites are low and are much the same up to age 35. Among the nonwhites, the rates for the two sexes are also much the same up to age 30, although on a higher level than for the whites. After this age, the rates for males, both white and nonwhite, rise rather sharply and reach a maximum at the older ages. Noteworthy is the fact that white males now show higher rates than colored females at all ages over 50. We shall presently consider the significance of these higher rates at the older ages, which have persisted throughout the period under discussion.

What do the high rates at the older ages signify? Fortunately, much light was thrown on this phenomenon by the analysis of Frost some twenty years ago. He was the first to point out that these high rates must not be interpreted to mean that the hazard from tuberculosis increases with advancing age, but that it represents rather the effect of the carry-over of the higher incidences of the disease in the earlier decades of this period. He showed this clearly in his graph, which is Chart 3, brought up to date recently by Dr. Floyd M. Feldman of the National Tuberculosis Association. In this chart, the rates of mortality are shown, by age, for a series of cohorts of males in Massachusetts, beginning with those born in 1880 and in each decade thereafter, including 1920. The course of mortality for each cohort is strikingly similar. In each case there is high mortality in infancy, a marked decline to a minimum between ages 5 and 10, and a rise to a maximum between 20 and 30. The interest in this presenta-

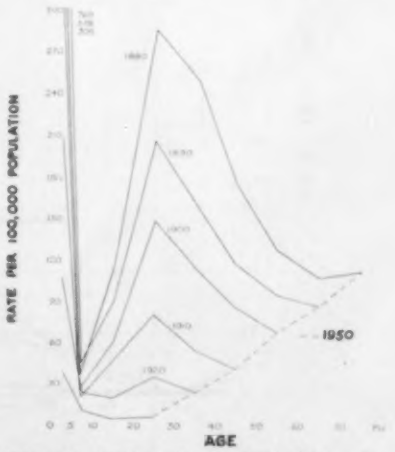

Chart 3—Tuberculosis Death Rates for Cohorts Beginning 1880, Massachusetts, Males

tion is the fact that—unlike the previous charts, which are for a specific year of time—this one, which follows the course of a cohort, shows low rather than high mortalities at the advanced ages of life. In other words, Frost's thesis, since confirmed by others, was that the high rates we observe at the older ages in our analysis of current tuberculous mortality reflect the carry-over of persons from the earlier periods of high mortality.

The decline in tuberculosis mortality which we have been considering has characterized every section of the country. The four principal geographical areas have shown about the same amount of improvement in the years since 1940. The group of North Central states enjoyed the best conditions; the Southern states, with their high proportion of Negroes, have had the highest rate, although in the past year they have fallen somewhat below the record of the Northeastern area.

Even more instructive are the death rates for each of the 48 states for 1955. The figures vary widely, from a minimum of 2.9 per 100,000 in Wyoming to a maximum of 24.6 per 100,000 in Arizona. Already, 11 states have rates of 5 or less per 100,000 and 15 more states have rates varying from 6 to 8.4 per 100,000. Only six states and the District of Columbia have rates higher than 12. But even in these states, marked progress has been made in recent years, perhaps even greater than in the more favored states. Only 10 years ago the rate in Arizona, which has always been at the bottom of the list, was of the order of 100 per 100,000.

The downward course of the death rate in the past fifty years, affecting as it has the entire population irrespective of age, sex, color, or geographical area, is an extraordinary achievement that could hardly be due to chance. The extent and continuity of the gains reflect rather the operation of powerful community forces and these, by general consent, have been associated with what has been loosely called the antituberculosis movement or campaign. This movement took shape in most health-advanced countries of the world early in the century and was largely the translation into action of the thinking of that gifted public health pioneer, Sir Robert Philip of Edinburgh. His contribution was essentially the concept that tuberculosis is an infection which spreads easily from open cases of the disease to susceptibles and that the best chance of controlling it would be, first, to find the active open cases; second, to isolate them so far as possible; third, to treat them in special hospitals or sanatoria; fourth and perhaps most important, to raise the general level of resistance of individuals by improving their health status and by raising their standard of living. In this program, which has changed but little in the course of the past fifty years, the tuberculosis clinic has been the key center of administration and service.

It would take us too far afield to develop in this presentation the proof of the effectiveness of this program, which has spread throughout the world. The evidence is ample from a wealth of investigations covering the experience of many tuberculosis hospitals and sanatoria and of particular groups under continuous, skilled observation. It is also attested to by the extensive development of tuberculosis clinics in every area of the country, administered and served by ever-increasing numbers of physicians specially trained and skilled; by the constant increase in the number of beds in tuberculosis hospitals and sanatoria, amounting at the crest of the movement to well over 100,000; by the ever-increasing facilities for the discovery of new cases, more particularly the extensive campaigns of casefinding by x-ray, which in a recent year reached more than 17,000,000; by the much more effective therapy with antibiotics and other chemicals and the newer sur-

gical technics; and finally by the mounting sums of money expended by government and private agencies for the control of this disease. There can be no better proof of the efficacy of all these steps than the amazing success which has been registered in the mortality picture here presented.

We shall now be concerned with the other and equally important side of the tuberculosis story, namely, morbidity. The record, unfortunately, is very sketchy and we shall have to piece together bits of information into a helpful indication of the incidence and prevalence of this disease.

First, we shall be concerned with the record of infection which reflects the data from tuberculin testing. A number of sample studies have been made of tuberculin reactors and, on the basis of these, estimates have been made of the number of tuberculin reactors in the United States and their distribution by age and sex. These figures confirm the general impression that much improvement has taken place on the score of infection. In earlier years, the results of tuberculin testing indicated very extensive tuberculous infection of the population, amounting to virtually 100 per cent at the adult ages. The current data suggest that this figure has been reduced to about one-third of the total population and that at the early ages, i.e., under age 10, the rate of infection has been reduced to about 5 per cent. In a group of Navy recruits, the average infection rate was recently found to be 3.5 per cent, although it was 9.1 per cent only five or six years ago. The rate of infection rises rapidly with age, is uniformly lower for females than for males, and reaches its maximum of about 60-odd per cent in the advanced ages of life. The figures vary somewhat with the geographic and ethnic groups studied. Chart 4, prepared by the National Tuberculosis Association, presents the estimated percentages of tuberculin reactors by age and sex for the latest year available. On this basis there would appear to be a total of about 56 million persons in the country already infected with the tubercle bacillus.

It is from this pool of reactors that the active cases of the disease develop. Currently about 70,000 such new active cases are being reported a year. Together with the unreported, the new active cases are in all probability close to 100,000. This would lead to the conclusion that under present conditions 1.8 out of each 1,000 infected persons become active in the course of a year. The ratio of new active cases to tuberculin reactors varies, however, with sex and age, as is indicated by special studies in various parts of the country. A recent study of the findings in New York City showed a fairly high rate of conversion from positive reactors to active cases in early childhood, a marked drop in the teen years, a rise in the early adult years, and, what is more significant, a precipitate decline in the conversion rate in the later years of life. It is noteworthy that once the childhood ages have been passed, the rate of new active cases per year per 1,000 infected persons lies somewhere between 2.5 and 1.5, with a figure close to 2 per cent at the older ages.

We are also concerned with the prevalence or total number of active cases in the population. Here we are dependent

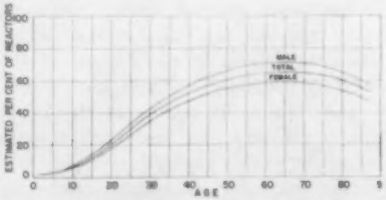

Chart 4—Estimated Percentage of Tuberculin Reactors by Age and Sex, United States, 1952 *

* Estimates of tuberculin reactors prepared by NTA on basis of data from Florida, Michigan, Minnesota, and Texas.

on what we know to be the incomplete figures available to health departments through case reporting by physicians, clinics, and other health facilities, and on estimates based upon the findings of x-ray examinations, which have in recent years been very extensive. From these several sources it would appear that the total number of active cases is about 250,000 in the United States, of which 150,000 are known and about 100,000 are unknown. To these must be added more than twice as many presently inactive cases which have previously been under medical and public health supervision and which over the years have profited from their care to the extent that they are now fairly inactive and safe. These potential reactivators, need watching, however. In other words, there are about 800,000 active and inactive cases significant for public health supervision. Half of these are known and half are not known to health authorities. There are, in addition, a great many more inactive cases which no longer require public health supervision but which would be an additional reservoir of infection should they ever reactivate.

It is instructive to note the distribution of these new active and probably active cases by age. Chart 5, taken from the series prepared by the U. S. Public Health Service referred to previously, presents the incidence rates by age. The rate of newly reported cases for the 15–24 age group is approximately the same as the average rate for the total population, with rates for the young ages in the group considerably lower and those for the older ages considerably higher. In this regard the incidence curve parallels the current mortality curve and probably for the same reason. The new active cases at the older ages represent the residual of earlier cohorts born when infections were rife. What is particularly interesting is the immense drop in new cases among infants, young children, and teen-agers.

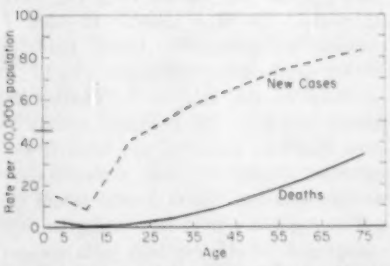

Chart 5—Age-Specific Rates for Newly Reported Active * Tuberculosis Cases and Tuberculosis Deaths, United States, 1955

* Includes probably active.

Even more instructive are the absolute numbers by sex and color. Almost half of the newly reported active cases are white males. The nonwhites, who constitute only 10 per cent of the population, account for one-fourth of all the newly reported cases. The white females record not only extremely low numbers of deaths but also the lowest number of new cases—about 3,000 and 18,400 respectively in 1955.

The newly reported and probably active cases by states show much the same variations as were seen for deaths. The lowest rates are found in exactly the same geographical area where the death rates were lowest, with the highest rates in the Southwest and some of the Southern states.

It is not possible in this paper to consider the composition and distribution of the total number of active cases, that is, the prevalence of active tuberculosis. The record is much too imperfect due to incomplete reporting and the varying standards of classification among the states.

Such, then, is the rather imperfect picture of current mortality and morbidity from tuberculosis. We may now attempt to sketch the course which this disease may take in the next decade or two. We have much ground for opti-

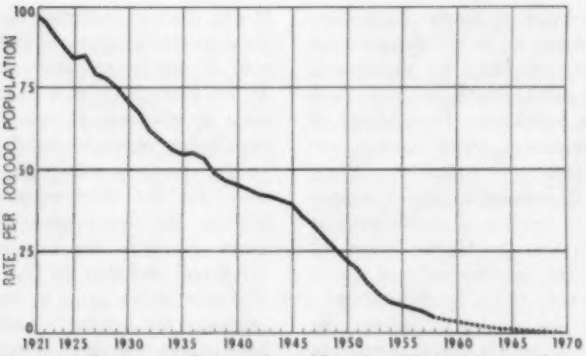

Chart 6—Decline in Tuberculosis Mortality, United States, from 1921 to 1957, with Projection to 1970 *

* The above chart and the computations for it were prepared in the Statistical Bureau of the Metropolitan Life Insurance Company, which service is gratefully acknowledged.

mism from the figures on mortality. The estimated death rate for last year was 7.8 per 100,000 and the rate of decline in recent years has been about 10 per cent per annum. A rough but ready procedure which has been widely used in forecasting the course of other diseases is to fit a curve to the figures of the past 7 or 8 years and to extrapolate for the immediate future. The result is shown in Chart 6. On this basis, the death rate should probably decline to 1.3 per 100,000 by 1967 and then drop to 0.3 per 100,000—or 3 per million population—by 1975. On an estimated population of about 220 million for that year, there would be on this basis of computation approximately 700 deaths from tuberculosis in 1975. We should then have arrived at our goal of the virtual eradication of tuberculosis.

But there are other methods of approach to future estimates. Dr. Feldman, in a thoughtful study published in the October, 1957, issue of this Journal,* made such an attempt by utilizing the rates of infection, incidence, and prevalence, by age and sex, and he arrived at considerably higher figures. He tells us that in estimating the number of reactors 25 years from his current date, he simply moved the infection rates for age currently prevailing forward that many years. For example, if the rate of infection in 1952 was 40 per cent at age 30, it would be 40 per cent at age 55 in 1977, and so forth, except that he tapered off the rate somewhat in the older age groups. With this assumption as his starting point, he proceeds to compute the number of new active cases by age in 1977 on the further assumption that current rates of conversion from reactor to active disease will be maintained over the next 25 years. He thus arrives at what I consider an astounding result, namely, 12,000 deaths from tuberculosis in 1977, or close to the number of deaths reported in 1957. Dr. Feldman admits at once that this figure is too high if the ratio of deaths to cases continues to decline and that 5,000 deaths would be a better guess. It is interesting in this connection to observe that in a memorandum prepared in his office, entitled "Comparison of Tuberculosis Infection, Morbidity and Mortality in 1955 and 1976, United States," dated December

* Feldman, Floyd M. How Much Control of Tuberculosis: 1937–1957–1977? A.J.P.H. 47:1235–1241 (Oct.), 1957.

15, 1955, an estimate is made of only 2,000 deaths from tuberculosis by 1976. Apparently the difference resulted from the marked decline in cases and deaths between 1952 and 1955. But even this low figure is three times the one I think will actually be recorded 20 years from now. Every datum available points to a more favorable outcome by 1977.

The difficulty with Dr. Feldman's method is that he is altogether too conservative. He underestimates the gains that are currently being made. Since 1952, death rates have declined by 50 per cent or more and infection and conversion rates have also dropped drastically in spite of the greatly increased activity in case finding. Further, it is in these last five years that the newer therapies, both medical and surgical, have been extended on a wide scale, and they have reduced greatly the number of positive and open cases. I am confident that if Dr. Feldman had made his basic computations with the figures available in 1957 rather than with those for 1952, and had he assumed a reasonable rate of further decline in case rates and death rates, he would have arrived at estimates of deaths much more in line with those I anticipate.

Already large sectors of the population have arrived at what is not far from the final stage of the campaign to control the disease. This can be said broadly of our white females and of the populations of such states as Utah, Idaho, Iowa, Kansas, and neighboring states in the Middle West. Surely what has been achieved there can be won by the rest of the country. We know how and we have the necessary resources. What we need is a nationally organized effort to do it. A demonstration in the Harlem area of New York City, spearheaded by the New York Tuberculosis and Health Association in cooperation with the New York City Department of Health, points the way. There, all the forces of the community—medical and social, official and voluntary—have concentrated their efforts on reducing sharply the incidence and mortality from tuberculosis in this notoriously heavily infected district. This entails the discovery of still undiscovered cases, provision of the necessary care, including the newer chemical therapies and surgical procedures, and the effective follow-up and rehabilitation of arrested cases. Vigorous efforts along these lines are obviously essential, not only for the welfare of those who have the disease but also for the protection of those who might otherwise become infected.

This local demonstration indicates what the affiliates of the National Tuberculosis Association could undertake. It is essential that they take leadership in their respective communities. The demonstration methods already developed should be capable of wide utilization, very much as the Framingham demonstration set the pattern forty years ago. Inspired by the knowledge and experience that the disease can be controlled, with our abundant resources and improved health standards and organization, there is good reason to be optimistic regarding the outlook in our country. This is not to say that the task will be an easy one or that it can be completed in a short time. But of the ultimate success of the effort there can no longer be any doubt.

The balance between the tubercle bacillus and man has finally given way in favor of man. The decline in the number of infections and in the number of active cases and deaths is a very real indication of this change in balance. The continuity of this trend and its extent, increasing as it has in recent years, justify the conclusion that the balance has already been so far disturbed as to give the highest hope for complete control of the disease. We have here something akin to what Ross, in his classic

memoir on malaria in India pointed out long ago—that when the level of the infecting organism is reduced below a value sufficient to replace the existing cases, then the course of disease must go downward and, if continued sufficiently long, will fall to the point where it becomes nonexistent. Such a shift in balance between the destructive forces of the tubercle bacillus and of host resistance has been reached. We cannot say exactly when control will be complete, but there is every indication that it will be some time in the course of the next 20 years.

Dr. Dublin is consultant on health and welfare of the Institute of Life Insurance, New York, N. Y.

This was an address presented at Yale University, March 17, 1958.

Preventive medicine for the individual and his family requires consideration of social and economic factors. It cannot avoid study of the relation of proverty, overcrowding, poor housing and many other social conditions to the pathogenesis, aggravation and continuance of disease.

With such scope medicine is indeed a social science and if these goals can be combined with the practice of the traditional arts of diagnosis and treatment, comprehensive medical care will become a reality.

(From Medical Education in a Changing World. David P. Barr. Acta Medic Philippina 12:70, 1957.)

The central role that statistical epidemiology has had in medical and public health progress is emphasized in the 1957 Hilda Freeman Silverman Lecture. This theme is particularly relevant in its bearing on the study of noncommunicable diseases and other current problems of public health.

STATISTICS AND MEDICAL KNOWLEDGE

Hollis S. Ingraham, M.D., F.A.P.H.A.

RECENT STUDIES OF a statistical nature on the relationship of cigarettes to cancer of the lung have aroused an unusually wide interest. Nearly all cigarette smokers have taken at least brief cognizance of the reports, as have those opposed to cigarette smoking. This, of course, takes in nearly the whole population. The cigarette manufacturers have followed the progress of investigation avidly, as have advertising agencies and tobacco farmers. All the health professions have been deeply concerned, but the statisticians and epidemiologists have taken a particular interest because of the nature of the studies themselves.

A total of 16 retrospective [1-16] and two prospective [17-20] studies on this subject have now been reported. These studies have been carried out in five countries scattered over the globe. The accumulated evidence is so voluminous, logical, and persuasive and the studies are so consistent, both internally and with one another, that the conclusions reached may be considered as proved beyond any reasonable doubt. These conclusions are that lung cancer occurs far more frequently among cigarette smokers than among nonsmokers and that there is a direct relationship between the incidence of lung cancer and the duration and intensity of the cigarette-smoking habit. Thus it appears that only one nonsmoking man in 275 will die of lung cancer, whereas one of every 10 men who smoke over two packs a day will succumb if present rates and trends continue. Women, as is well known, suffer less lung cancer, but similar differences exist between smokers and nonsmokers.

It is evident from these statistical studies that cigarette smoking is an important causative factor in lung cancer or else that the factor which precipitates cancer also selectively impels those persons who are predestined to develop lung cancer to take up the cigarette habit. It is to be noted that under the latter alternative, a very sensitive type of selection would be required, since neither cigar smoking nor pipe smoking shows the same degree of association with lung cancer. Nor does this theory explain the phenomenal rise in frequency of lung cancer in recent years, and it becomes even more untenable in view of recent evidence which suggests that smokers who give up the habit revert toward the lessened risk status of the nonsmoker. Recent laboratory evidence is consistent with the conclusion that must be drawn from the statistical research. Malignant neoplasms have been produced by tobacco smoke condensates

in animals.[21–25] Also, changes in the human tracheobronchial tree consistent with carcinoma in situ are seen much more frequently in smokers than in nonsmokers.[26–27] The statement recently made by the Study Group on Smoking and Health,[28] "The sum total of scientific evidence establishes beyond reasonable doubt that cigarette smoking is a causative factor in the rapidly increasing incidence of human epidermoid carcinoma of the lung," aptly summarizes the story.

It is of interest, although not necessarily germane to the lung cancer problem, that three investigations [20, 18, 19] have adduced evidence that smokers have a significantly reduced expectation of life. This reduction is largely attributed to excess deaths from cardiovascular disease among males. The newspapers report that the scientific group employed by the tobacco industry has blandly denied the significance of the association of cigarettes and lung cancer. The arguments used by this group imply strongly that statistical studies on man are of relatively little value and are necessarily inconclusive in nature, and that the true facts can be ascertained only by animal experimentation and clinical observation. They therefore urge that no public health action be taken until laboratory and clinical studies have given ultimate answers as to the nature of cancer.

This attack on the statistical study of disease in human populations, while meaningless and misleading, is nevertheless expressive of a belief formerly widely held. Unfortunately, it represents a view still held by ill-informed persons. It therefore seems appropriate once again to point out the indispensable part that statistical methodology has had in medical progress and to note that statistical reasoning is basic to nearly all scientific investigation. Even physics, considered the most precise of all sciences, uses the statistical approach, particularly in its visualization of the mechanics of the atom. It is further to be observed that mass observations on man have been highly productive of scientific knowledge and of practical application throughout the advance of science. This does not in any way deprecate the value of animal experimentation in the laboratory or of clinical investigation in the ward. These methods have been and remain indispensable to medical progress. I do, however, assert the great value of the epidemiological approach, with its heavy reliance on statistical compilation and analysis of events observed in human populations. It has been and will in all probability remain at least as rewarding as the other two methods.

Perhaps a few definitions are needed here. Briefly stated, epidemiology is the science concerned with the mass phenomena of disease in man. The medical statistician is first a mathematician who adapts his knowledge to the study of disease. The epidemiologist is first of all skilled in medicine, but he adopts a mathematical approach to the study of disease in groups of people. As the two work together, the statistician becomes a better epidemiologist and the epidemiologist a better statistician, so that the two approach one another closely in their skills. Since the distinguishing feature of an epidemiological study is its use of numbers and their analysis by statistical methods and logic, it seems permissible in the present context to use the words "statistical" and "epidemiological" interchangeably. This is to emphasize the difference between the epidemiological and the clinical or laboratory study of disease. Actually, of course, both the clinician and the laboratory investigator are now increasingly recognizing the value of statistical reasoning.

To test the thesis that statistical epidemiology is an important and indispensable method for acquiring medical knowledge, it seems best to adopt an

historical approach and to cite illustrative examples. In some of the earlier studies to be mentioned, the statistical technic employed was not of a high order, having antedated the development of modern biostatistics. Where, however, the conclusions have come from observations of human population groups and from reasoning based largely on numerical preponderence of evidence, it is reasonable to regard such a work as statistical in nature.

It is in the field of communicable disease that the statistical study of human populations has been most fruitful, and there are numerous instances in which the careful study of naturally occurring epidemics has led directly to the discovery of both fundamental knowledge and practical control methods. Communicable disease has been subjugated by four basic procedures: (1) Immunization, (2) control of inanimate vehicles of infection, among which water and milk are chief, (3) control of insects and other living vectors, and (4) therapy.

Unquestionably the greatest single life-saving procedure yet developed by the human mind is vaccination against smallpox. In the course of the 161 years since Jenner's discovery,[30, 31] it has probably saved as many lives throughout the world as all the rest of preventive and curative medicine. There is no indication that Jenner was an accomplished statistician or that he constructed tables or explored probabilities, yet it is apparent from this account that his studies were basically epidemiological in nature and that he did count and compile and reason on a numerical basis. Jenner had no experimental laboratory, he never heard of a virus or of virology, he never even saw a bacterium, and he was not certain how smallpox was transmitted. Nevertheless, his studies showed conclusively how to prevent one of the most devastating of all human maladies.

In 1854, John Snow studied a cholera outbreak in London.[32] It was a good epidemiological study by any standards, skillfully and methodically done, with careful enumeration and astute statistical analysis. He was well acquainted with current medical knowledge and drew his inferences shrewdly. His report is an epidemiological masterpiece, in which he showed conclusively that cholera is a transmissible disease that can be spread by water as well as by contact. Snow also antedated the bacteriological and virological era. He did not have the benefit of laboratory aid. He too, however, was definitive in his proof and in his call for prevention. His studies provided the knowledge needed to stimulate action in preventing contamination and, later, in purification of water supplies with the consequent prodigious saving of human lives from cholera, typhoid fever, dysentery, and the minor water-borne plagues.

That milk frequently serves as a vector of infection was suspected early. Apparently the first or one of the earliest published reports was supplied by Michael Taylor[33] in Penrith, England. In 1857, he studied an epidemic of typhoid fever and traced its transmission through milk. In 1867, the same man showed that scarlet fever was also capable of being milk-borne.[34] Taylor concluded that milk may be contaminated "either from the soiling of the hands, or from direct admixture of the exuviae or discharges with liquids, or vessels used by the patient, by the drying up of these discharges, or the dissemination of their poisonous elements either in the form of dust, or by particles of dust already existing in the department acting as carriers of the infected germs, which, when absorbed by liquids, by adhering to clothes, or by currents of air, might be carried to distant quarters." This statement was made before the bacteriological era and again illustrates how epidemiology has so frequently anticipated laboratory confirmation.

By 1881, more than 70 outbreaks of record had been traced to a milk supply.[35] This triumph of epidemiology was also epochal and led directly to the control of disease through the application of pasteurization. The control of milk-borne illness has loomed large in the reduction of infant mortality and also in lowering the frequency of typhoid fever, tuberculosis, streptococcal disease, diphtheria, and a host of lesser maladies at all ages.

The decline of insect-borne disease was also profoundly influenced by epidemiological studies, although less completely than in the case of immunization procedures or of water-borne and milk-borne disease. It appears that man has speculated on the part insects and other arthropods play in disease transmission since the days of Rome. However, the matter was finally settled in the exciting years between 1877 and 1900. In 1877, Manson,[36] on the basis of epidemiological data, suggested that mosquitoes transmitted filariasis and then proceeded to find filaria in mosquitoes. He failed at this time, however, to complete the links of the chain and show that mosquitoes infected man. In 1881 Carlos Finlay,[37] after years of observation on yellow fever, with extensive compilation of data as to occurrence by season, temperature, altitude, race, and locality, as well as correlation with similar data about mosquitoes, presented a convincing array of material incriminating Aedes aegypti as the vector of yellow fever. Finlay's evidence, although highly persuasive, was not conclusive, but he did proceed to demonstrate the correctness of his theory by experiments on human volunteers. These experiments, while positive, were less rigidly controlled than Reed's later trials and did not gain general acceptance.

In 1882, King [38] an armchair epidemiologist, assembled from the literature a list of cogent reasons which tended to implicate mosquitoes as a cause of malaria. In 1891, Smith and Kilbourne [39] showed conclusively that ticks transmit Texas fever, the first demonstration of a mammalian disease transmitted by an arthropod. Smith's laboratory studies had been pinpointed by long and careful epizootological studies of Texas fever in cattle by Salmon [40] and others which indicated that the tick was necessary for transmitting the disease from one ox to another. At the turn of the century, Ross [41] demonstrated the role of mosquitoes in malaria transmission. Low [42] completed the work on filariasis, Bruce [43] transmitted trypanosomiasis by the tsetse fly, and Simond,[44] on epidemiological considerations, pointed out the method by which bubonic plague is spread.

In the basic work leading to man's conquest of insect-borne disease, statistical observation played as vital although not as definitive a role as it had in that leading to immunization against water-borne and milk-borne disease.

Specific therapy, the fourth method of communicable disease control, owes least to statistical observation. With very few exceptions our tools of treatment were forged in the laboratory and clinic. Now, however, therapeutic trials are almost invariably conducted as carefully controlled statistical investigations.

The only way the efficacy of immunizing procedures in man can be finally assessed is by statistical methods. Nowhere was this demonstrated more brilliantly or conclusively than in the polio field trials.

It is of interest that a remarkably sophisticated approach to this same problem was taken in Boston in 1754 to test the danger of inoculation with smallpox.[31] Inoculation was the first effective immunizing procedure, developed centuries before Jenner's day. It was highly effective, probably even more efficient than vaccination, but unfortunately carried a definite if low mor-

tality risk. It also was a highly productive source of fully virulent smallpox. After having been introduced into England by Lady Mary Wortley Montague, it was popularized in America by Cotton Mather, Boyleston, and others. Benjamin Franklin described the carefully planned test of inoculation's risk to life as follows:

"As the practice of Inoculation always divided people into parties, some contending warmly for it, and others as strongly against it; the latter asserting that the advantages pretended were imaginary, and that the Surgeons, from views of interest, concealed or diminished the true number of deaths occasioned by Inoculation, and magnified the number of those who died of the smallpox in the common way: It was resolved by the Magistrates of the town, to cause a strict and impartial enquiry to be made by the Constables of each ward, who were to give in their returns upon oath; and that the enquiry might be made more strictly and impartially, some of the partisans for and against the practice were joined as assistants to the officers, and accompanied them in their progress through the wards from house to house. Their several returns being received, and summed up together, the numbers turned out as follows:

Had the Smallpox in the Common Way		Of These Died		Received the Distemper by Inoculation		Of These Died	
Whites	Blacks	Whites	Blacks	Whites	Blacks	Whites	Blacks
5,059	485	452	62	974	139	23	7

"It appeared by this account that the death of persons inoculated, were more in proportion at this time than had been formerly observed, being something more than one in a hundred. The favourers of Inoculation however would not allow that this was owing to any error in the former accounts, but rather to the Inoculating at this time many unfit subjects, partly through the impatience of people who would not wait the necessary preparation, lest they should take it in the common way, and partly from the importunity of parents prevailing with the Surgeons against their judgment and advice to inoculate weak children, labouring under other disorders; because the parents could not immediately remove them out of the way of the distemper, and thought they would at least stand a better chance by being inoculated, than in taking the infection, as they would probably do, in the common way. The Surgeons and Physicians were also suddenly oppressed with the great hurry of business, which so hasty and general an Inoculation and spreading of the distemper in the common way must occasion, and probably could not so particularly attend to the circumstances of the patients offered for Inoculation."

Between these two inquiries on polio and smallpox there have been mountains and valleys. Typhoid immunization went for decades, with no clear-cut answer as to its value, since no controlled tests were carried out. It is said that Almoth Wright, to whom credit for typhoid vaccine is largely due, was highly suspicious of statistical inquiries. I fear it is merely a coincidence, however, that his vaccine remained in doubt for so long.

Whooping cough vaccine was in question for many years. The value of the vaccine was resolved in large part by a study devised by Hilda Freeman Silverman in conjunction with Perkins and others.[45] Epidemiology has also been

useful in giving indirect information as to the value of immunization. A statistical compilation and analysis of a number of milk-borne outbreaks investigated by the author and others [46] offered evidence that the immunity to streptococcal infections was of a complex nature and that immunity to exotoxin conferred little protection against bacterial invasion. This suggested that artificial immunity from injected exotoxin would not be of great value.

Many of the important contributions to knowledge in communicable disease have come directly from statistical analysis of epidemiological data. These are multitudinous and I shall mention only a few of the more striking. The work of Holmes [47] in Boston and of Semmelweis [48] in Vienna on the character of puerperal sepsis is a tribute to the epidemiological method. Their studies in the prebacteriological era clearly showed that childbed fever was a communicable disease and pointed out methods for reduction in frequency. Both Holmes and Semmelweis relied heavily on statistical reasoning in arriving at their conclusions. Holmes relates that he consulted "a competent person," presumably a mathematician, to advise him on the probability that a series of 16 fatal cases of puerperal sepsis might occur by chance alone within a month in the practice of a single practitioner who delivered 250 women a year. Semmelweis' publications are heavy with tables of percentages. Apparently, the difference in attack rates from puerperal sepsis between women delivered by medical students and by midwife students first drew his attention to the problem.

Hans Zinnser,[49] a distinguished laboratory scientist, made an excursion into statistical epidemiology in 1934. As a result, he presented adequate evidence that the Rickettsia of epidemic typhus may remain dormant in the human body for decades, may then be reactivated and cause clinical illness. His statistical studies were prompted by some laboratory leads suggesting that the Rickettsia of Brill's disease were similar to those from epidemic typhus. At that time no laboratory methods were available which would provide equally positive parallel laboratory evidence. Such microbiological aids have since been elaborated and their application has of course given corroboration.

Maxcy [50] in 1929, offered evidence of an epidemiological nature that murine typhus had a rat or mouse host and was transmitted by arthropods to man.

The riddle of serum hepatitis [51] was unfolded by statistical methodology, as was the effect of certain maternal diseases in producing congenital defects.[52]

The worth of such procedures as ultra violet light or aerosols as barriers to infection can only be tested by statistical analysis of tests performed on human beings. In this field also, Hilda Freeman Silverman [53–54] played a prominent role and indeed lost her life while actively engaged in such a study.

One of Hilda Freeman Silverman's earlier activities is also noteworthy in this connection. Her assistance to Godfrey [55] in his statistical studies of measles mortality led directly to a remarkable reduction in deaths from measles in children's institutions.

Although communicable disease control has rested so heavily on information supplied by statistical reasoning, it is not to be supposed that there have been no triumphs of the method in the noncommunicable maladies. The following examples are illustrative of the value of statistical study to this latter class of diseases.

Our knowledge of carcinogenic agents and of means of preventing certain types of neoplastic disease is very largely a product of epidemiological studies. Early examples include scrotal cancer in chimney sweeps,[56] cancer from contact with spindle oil,[57] cancer of the bladder in aniline workers,[58] and skin

cancer from arsenic.[59] Within the past few years, similar studies have shown the importance of X-rays in inducing leukemia. These include the reports on the leukemia rate of those treated with X-ray for spondylitis,[60] the effect on the child of maternal pelvic X-rays,[61] and the demonstrated excess leukemia deaths in roentgenologists.[62] The latter three are excellent examples of good statistical studies in human population groups yielding information which would be difficult if not impossible to obtain by any other procedure.

Much was learned about deficiency disease without benefit of laboratory technics or animal research. Scurvy was once a disease of great prevalence among sailors. It is estimated that in the period from 1500 to 1800 A.D. it killed as many seamen as the combined effects of shipwreck, disease, and battle. By the year 1600 it had become known that scurvy occurred only in the absence of fresh food and that fresh fruits were curative. In 1605 a nicely controlled experience with four ships of the East India Company showed that lemon juice would prevent scurvy.[63] One ship with 202 men aboard made the voyage to India with no deaths, each man who showed any signs of scurvy being given three teaspoonfuls of bottled lemon concentrate daily. Among 222 men on the three accompanying ships who were given no lemon juice, 105 died, apparently mostly from scurvy.

Despite this evidence and the recommendations of John Woodall [64] in his book, The Surgeon's Mate, published in 1617, no official action was taken for another two hundred years. James Lind's studies [65] in the mid-1700's, which included a controlled therapeutic trial of lemon juice and other agents, finally led to official action. This had dramatic results and essentially abolished scurvy first in the Royal Navy and later in the British Merchant Marine.

Goldberger's [66] work on pellagra is a more recent example of the value of the statistical approach to the study of disease.

Epidemiology has also shown the way in revealing the toxicity of various substances. Numerous examples might be quoted but one of the best-known of the earlier ones is Sir George Baker's demonstration of the danger of using lead-lined cider presses.[67] A more recent example concerns fluorine.[68–70] Its toxicity was investigated and the beneficial effects on dental caries were shown beyond doubt by long and carefully conducted statistical studies.

Recognition must also be accorded to the great impetus to medical knowledge given by the official compilation and publication of vital statistics. Farr, who is credited with pioneering in this field, has a secure place among the great names in the tale of human progress.

Since statistics pervade all scientific thinking, this review is obviously far from exhaustive. I have cited only an incomplete list of investigations characterized by being predominantly statistical in nature. I have also tried to demonstrate that under many circumstances statistical studies of human groups may be conclusive and definitive. W. H. Frost [71] our foremost epidemiologist, under whom Hilda Freeman Silverman studied, expressed this thought best: "The opinion is more or less prevalent that inferences based upon epidemiological argument cannot be truly conclusive because the evidence is purely circumstantial. Such opinion has frequently failed to take account of the whole mass of evidence and to follow the argument, which is necessarily built up step by step in a somewhat complex and perhaps tedious way. Given sufficient scope and accuracy of observations, a conclusion as to the nature and spread of a disease may often be established quite firmly by circumstantial evidence well in advance of experimental confirmation. Moreover, many problems of

disease transmission which are highly important from the standpoint of prevention are such that can be solved only by investigation of this kind. The weakness in conclusions drawn from circumstantial studies is usually chargeable not to basic defects in the methods of investigation, but more often to paucity or inaccuracy of data, or to faults of logic in their interpretation."

It is difficult not to comment on the plea that control measures on cigarette smoking should be withheld until we have amassed more knowledge of the intimate nature of cancer. Past experience reveals that we should initiate preventive steps without waiting to learn all the basic facts about every problem. As long as man studies, he will continue to learn more and more about the situations with which he is confronted. He must, however, take steps to meet threats to his health on the basis of current knowledge and not wait until all wisdom is revealed unto him.

We have noted what far-reaching results came from the studies of Jenner and Snow, practical benefits completely incommensurate with their knowledge of the biology of the diseases with which they dealt. This experience has been repeated over and over in communicable disease control. The balance between man and his pathogens is a delicate one, a balance achieved over countless eons in which each strove with the other and neither won. In most such contests it takes but a little push to tip the balance conclusively against the parasite and this may frequently be done by relatively simple methods. It is quite possible that several communicable diseases will vanish from the earth long before we gain any adequate knowledge of their biology.

Leprosy is a good example of a disease which can exist only under conditions which are markedly adverse to the host. Leprosy was formerly prevalent throughout the world. Fifty years ago small pockets prevailed in Canada and in the northern United States. It has now disappeared from these areas and can no longer propagate itself when reintroduced into those regions. In the southern United States its capacity to be transmitted is approaching zero. Similarly for many decades, tuberculosis has been slowly failing to reproduce itself in well-fed, well-housed human populations. Malaria spontaneously disappeared from the northern United States shortly after the turn of the century and with a rather feeble push has now been nearly rendered extinct in the southern United States.

It can also happen that cancer and heart disease may be controlled long before we understand the ultimate nature of the processes underlying them. Certainly the suggestion that we withhold action until we understand causes is contrary to our best experience and our reason.

The alacrity with which the public approves the findings of medical science and applies them to preventive use has varied greatly in the past, presumably being dependent on such matters as the climate for acceptance of new ideas, the proportion of the population affected, the seriousness of the malady, and whether action might adversely affect vested interests. Thus, scurvy was serious but only seamen were commonly affected and chiefly ordinary seamen rather than officers. Prevention required effort and cost money, although not much. Furthermore, knowledge about prevention became available at a time when scientific ideas were accepted only after a struggle. In any event, nearly 200 years elapsed before the prevention of scurvy was effectively implemented. Vaccination, on the other hand, began to catch on within a few years. Smallpox was a universal threat and carried a high fatality rate. Vaccination also had few vested interests to overcome. A half century later,

Holmes and Semmelweis aroused vitriolic opposition in the medical profession which delayed general acceptance of their ideas for over two decades. Obstetricians felt themselves branded as conveyors of infection and as agents of death rather than as healers and protectors and hence refused to accept the painful new ideas.

In the case of cigarettes, it seems incumbent on us to let the public know what risks are taken in smoking and to advise reduction or cessation of the habit. There will of course be opposition and merely broadcasting the truth will not change habits overnight. The majority of young cigarette smokers may continue to smoke so long as they believe the odds are in their favor and that the risks are in the far future, when they have reached the senility of 40 or 50, the age at which the young believe death may be a great mercy. The older, in many cases, will resign themselves and continue to enjoy their habit. Manufacturers and dealers will not like to fancy themselves as purveyors of death, nor will advertisers enjoy the picture of themselves as sirens luring men to destruction. Cigarettes are also big business with a considerable segment of the populace dependent on them for a livelihood. Furthermore, people enjoy smoking cigarettes.

Although epidemiologists were the first of the medical fraternity to employ statistical thinking in their investigations and although earlier medical statisticians confined their work to epidemiology, the monopoly of epidemiologists on statistics has now been broken. It is only within a special framework and in speaking of the past that one may speak interchangeably of statistics and epidemiology. Essentially, all medical scientific work now relies on statistics in some measure and in some phase of its progress. Nevertheless, it seems certain that epidemiology, with its continued reliance on statistical methodology, has much yet to contribute, particularly in unfolding the secrets of chronic disease. The extent of its future success cannot be predicted, except that it should be useful so long as human ills prevail.

There are many morbid states in man for which there are no close analogies in animals. In addition, reactions of animals may differ sufficiently from those of man to be misleading; this has been true particularly in carcinogenesis. Under such conditions, studies in human herds offer the greatest hope of progress. There are a number of fields which call for increased attention by statisticians and epidemiologists. It has been noted that much of our feeble scientific store in cancer has come from the use of this method and there is still much to learn.

Mental illness is a problem of the utmost complexity. Approaches so far have been most unrevealing and unsatisfactory. It is also complex epidemiologically, but challenging, and the potential rewards of study are almost immeasurably great.

Public attention has been focused recently on the threat posed to present and future generations by exposure to both natural and artificial sources of radioactivity. It seems likely that many of the answers to questions about radioactivity can best be obtained through large-scale studies of human populations.

Another emerging problem which can only be measured by epidemiology is the effect of air pollution on human health.

Communicable disease investigation through epidemiology will continue to invite active minds. It has always been fun and will so continue, even though the magnitude of the practical challenges seem destined never again to equal those in noncommunicable maladies.

It was in the field of statistical epidemiology that Hilda Freeman Silverman performed so effectively. A year ago, Dr. Perkins recounted her many con-

tributions to the control of communicable diseases. I have tried to show how her field of endeavor has been and will continue to be vitally important to the whole area of medical progress and how much poorer and further behind we would be without the skills of the profession she so ably exemplified.

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Analysis for Water Quality Course

A two-week course in "Chemical Analyses for Water Quality" will be presented December 1–12 at the Robert A. Taft Sanitary Engineering Center in Cincinnati. Designed for graduate chemists and professional personnel with extensive background in water supply and water pollution control, the course will give special emphasis to the chemical determinations used in evaluating water quality. New analytical methods and recent developments in instrumental technics will be studied. The staff will be drawn from the Center, regulatory agencies, and industry. Chief, Training Program, Robert A. Taft Sanitary Engineering Center, 4676 Columbia Parkway, Cincinnati 26, Ohio.

The view that cigarette smoking is an important factor in the production of lung cancer is still a subject of controversy. The extensive epidemiological, experimental, pathologic, and chemical evidence in support of this opinion is reviewed, and the author points out that it cannot be rejected on the ground that cigarette smoking may also be associated with other diseases.

THE ASSOCIATION BETWEEN SMOKING HABITS AND DEATH RATES

E. Cuyler Hammond, Sc.D., F.A.P.H.A.

THIS IS a reply to a recent paper by Berkson [1] in which he takes issue with the conclusions drawn by the authors of two independent prospective studies on smoking in relation to death rates: Doll and Hill [2, 3] and Hammond and Horn.[4-6] These will hereafter be referred to as the British study and the American study, respectively. Although differing in many details, including geographic location, type and age distribution of the subjects, and method of analysis, the studies are similar in design, they were started at about the same time, and the results to date are essentially the same.

The major findings (of both studies, unless otherwise specified) may be summarized as follows:

The total death rate increased with the amount of smoking, being lowest in nonsmokers and highest in heavy smokers; the death rate of cigarette smokers was considerably higher than the death rate of pipe and cigar smokers. The mortality ratio (death rate of cigarette smokers divided by death rate of nonsmokers) was extremely high for deaths attributed to cancer of the lung, cancer of other mucous epithelium directly exposed to tobacco smoke products (i.e., lip, tongue, mouth, larynx, pharynx, and esophagus), and peptic ulcers. The mortality ratio was very high (but far lower than those mentioned in the foregoing) for several pulmonary diseases other than lung cancer and, in the American study, cancer of the bladder and nonsyphilitic aortic aneurysm. The mortality ratio was high for coronary artery disease and, in the American study, cirrhosis of the liver. In the American study, the mortality ratio was significantly greater than 1.00 for cerebral vascular lesions.

From the standpoint of public health, the difference between the death rate of cigarette smokers and the death rate of nonsmokers may be a more useful index than the mortality ratio. Deaths attributed to coronary artery disease accounted for a larger percentage of the difference in the total death rate (cigarette smokers compared with nonsmokers) than did deaths from any other disease. Ex-smokers who had given up the habit several years before the time of enrollment had lower death rates from lung cancer and from coronary artery disease than had men who were currently smoking cigarettes at the time of enrollment. Disregarding tests of statistical

significance, one gets the impression, particularly from the American study, that the death rates from a number of other diseases (but certainly not all diseases) may perhaps be somewhat higher among cigarette smokers than among nonsmokers. Death rates from violence (including accidents, suicide, and homicide) were a trifle lower among smokers than among nonsmokers in the American study based upon 640 deaths from these causes but were higher among smokers than nonsmokers in the British study based upon 77 deaths from these causes (the difference not being statistically significant in either study).

These findings confirm the results of at least twenty different independent retrospective studies on smoking in relation to lung cancer, as well as a number of retrospective studies on smoking in relation to coronary artery disease, cancer of the buccal cavity, cancer of the larynx, cancer of the bladder, and peptic ulcers.[7-17] * They also confirm the results of a previous study on smoking in relation to the total death rate.[18]

The authors of both prospective studies and many other investigators have expressed the opinion that cigarette smoking is an important factor in the causation of lung cancer, although not the only cause of this disease. This opinion is based upon a mass of epidemiological, pathologic, experimental, chemical, and clinical evidence in addition to invaluable background information concerning cancer in general. The writer has expressed the opinion that smoking is a causative factor (though not the only factor) for cancer of the mucous epithelium in sites, other than the lung, which are directly exposed to tobacco smoke products; that cigarette smoking increases the death rate from coronary artery disease (which does not necessarily imply that cigarette smoking has anything to do with the development of atherosclerosis of the coronary arteries); and that cigarette smoking has a deleterious effect on some patients with peptic ulcers.[19, 20] These opinions are based upon evidence from many sources.

Berkson's criticism is based upon the notion that it is unreasonable to suppose that one factor (smoking) could result in increased death rates from a multiplicity of diseases. He comments in part as follows:

> The existence in the data of both these prospective studies, of association between smoking and death rate from many categories of cause of death other than lung cancer, and indeed chiefly with these other categories, raises a serious challenge to the explanation that the statistical association observed between smoking and lung cancer has a direct causal basis. . . .
>
> For myself, I find it quite incredible that smoking should cause all these diseases. It appears to me that some other explanation must be formulated for the multiple statistical associations found with so wide a variety of categories of disease. . . .
>
> . . . when an investigation set up to test the theory, suggested by evidence previously obtained, that smoking causes lung cancer, turns out to indicate that smoking causes or provokes a whole gamut of diseases, inevitably it raises the suspicion that something is amiss. It is as though, in investigating a drug that previously had been indicated to relieve the common cold, the drug was found not only to ameliorate coryza, but to cure pneumonia, cancer, and many other diseases. A scientist would say, "There must be something wrong with this method of investigation."

The hypothetical "scientist" quoted above who cannot accept evidence indicating that a single drug is effective in the treatment of many different diseases must have overlooked the advances in modern pharmacology. A few examples will serve to illustrate the point. According to the Public Health Service, sulfonamides are effective in the treatment of at least 20 different diseases and probably more.[21] Aside from the beneficial effects, the sulfa drugs can produce a multiplicity of deleterious effects

* References are given to only a few of these studies because of limitations of space.

in some individuals, including agranulocytosis, hepatitis, anemia, extensive rash, hemoglobinuria, uremia, and granulocytopenia as well as nausea, vomiting, headache, fever, and hematuria. The toxic phenomena vary from patient to patient. The antibiotics have an extremely wide range of effectiveness. For example, aureomycin is listed as effective in the treatment of diseases produced by at least 25 different organisms, including both gram-positive and gram-negative bacteria, spirochetes, Rickettsia, amebas, and viruses. Cortisone is used in the treatment of such diverse diseases as rheumatic fever, rheumatoid arthritis, leukemia, Hodgkin's disease, lymphosarcoma, bronchial asthma, dermatoses, bursitis, ulcerative colitis, pulmonary granulomatoses, and serum sickness.[22]

Clearly, many drugs have a multiplicity of uses and some have a multiplicity of possible side effects as well. Furthermore, different drugs are often mixed together, thereby greatly increasing the range of effects of the prescription. Most remarkable is the use of intravenous injection of large volumes of water containing sodium chloride, protein hydrolysate, and dextrose, and to which may be added vitamins, antibiotics, and drugs of various sorts. The introduction of these parenteral fluids has been enormously useful in the treatment of critically ill patients. In addition their use has reduced operative mortality and thereby increased the curability of cancer and many other diseases and injuries.

Are there any known factors which are capable of increasing the death rate from a multiplicity of different diseases?

The answer is clearly yes. The most obvious examples are malnutrition, chronic fatigue, extremes of temperature, and the combination of factors which may be summed up as "bad living conditions." A factor which does not cause a disease may nevertheless have a deleterious or fatal effect on persons suffering from that disease. Probably any factor which puts a strain on the body as a whole increases the probability of death (or hastens death) of patients suffering from almost any critical illness or injury. For example, rest is an almost universal treatment for such conditions and, at a critical point, lack of rest—or undue exertion—may mean the difference between life and death.

The great London fog of 1952 presents an interesting example of a sudden and brief change in environment which had a dramatic effect on the death rate.[23] The fog, which was of unusual density and contained a number of air pollutants, blanketed the city almost continuously for four days in December of that year. In the ensuing week, the death rate rose by a factor of about 2.5 and it is estimated that the episode resulted in about 3,500 to 4,000 excess deaths. The fog obviously affected the lungs. Respiratory diseases (bronchitis, pneumonia, and to a lesser extent respiratory tuberculosis, influenza, and other lung diseases) accounted for nearly 59 per cent of the increase in deaths recorded during the first week and 76 per cent of the increase recorded during the next week. Heart diseases (coronary artery disease, myocardial degeneration, etc.) accounted for a large part of the remainder, but roughly 16 per cent of the total increase for the entire episode was scattered among many other diseases, including lung cancer. There is evidence that many of those who died were already in poor health. However, it is apparent that the fog did not merely take off those who otherwise would have died a week or two later. If such had been the case, the death rate would have dropped below the normal level immediately after the episode; this did not occur.

The history of influenza epidemics in the United States from 1918 to 1951 presents a somewhat similar picture.[24]

Influenza so often leads to pneumonia that influenza epidemics are usually measured in excess death rates from influenza and pneumonia combined. However, influenza epidemics are invariably accompanied by an increase in death rates from other causes and there is no doubt that this increase is produced by the influenza. Therefore, Collins and Lehmann have suggested that the rise in the total death rate during the epidemic period is the best measure of the total impact on mortality.[24] In the great epidemic of 1918–1919, 92 per cent of the excess deaths were attributed to influenza and pneumonia. However, in epidemics since that time there has been a progressive though irregular decline in the percentage of excess deaths attributed to pneumonia and influenza and a corresponding increase in the percentage attributed to other diseases. For example, the proportion of excess deaths attributed to other diseases was 23 per cent in the epidemic of 1920, 50 per cent in the epidemic of 1936–1937, 71 per cent in the epidemic of 1943–1944, and 85 per cent in the small epidemic of 1947. This trend, at least in recent times, is probably largely attributable to advances in the treatment of pneumonia. Of the excess deaths not attributed to influenza and pneumonia in the 1943–1944 epidemic, 48.1 per cent were attributed to heart diseases, 7.4 per cent to nephritis, 6.4 per cent to diabetes, 5.2 per cent to tuberculosis, and 33.0 per cent to various other causes.

One may ask, if influenza was responsible for these excess deaths, why were they not all attributed to influenza on death certificates? Logically, most of those attributed to pneumonia should probably have been attributed to influenza, since in many instances influenza lowers the resistance of the individual, who in consequence develops pneumonia, which is the immediate cause of death. On the other hand, most of those individuals whose death was attributed to heart disease probably had heart disease prior to the onset of influenza; in these cases, heart disease was properly considered to be the principal or underlying cause of death, with influenza a contributing or precipitating factor.

Berkson's main argument is that it is virtually unbelievable that one factor, such as smoking, could cause a large number of diverse diseases; and the appearance that it does so serves to discredit the findings of the prospective studies and also to discredit the theory that smoking is a causative factor in lung cancer. The examples given in the foregoing were cited to show that there is nothing unusual about one agent having a multiplicity of effects (good or bad) on the human body. Furthermore, it is apparent that a factor can increase death rates from various diseases without having any causal relationship to the initial development of those diseases.

Evidence bearing on the problem at hand is so voluminous that it cannot be summarized adequately in anything less than a full-length book. A brief and incomplete summary will have to suffice here.

Tobacco smoke is a highly complex mixture of alkaloids, aldehydes, ketones, acids, alcohols, phenols, hydrocarbons, various other organic compounds, and many different inorganic compounds.[25] A great deal of research is now being done on the chemistry of tobacco smoke and additional compounds are continually being identified, but it will probably be many years before the picture is complete. Many of the known compounds are irritants; some (nicotine, carbon monoxide, arsenic, hydrogen cyanide, hydrogen sulfide) are highly toxic; the presence of at least one known carcinogen (3–4 benzpyrene) has been definitely established; and the presence of several other known carcinogens has been reported.

Nicotine is a deadly poison when ad-

ministered in a single large dose and 1 mg per kg of body weight is probably a fatal dose for some individuals. The main stream smoke of one cigarette contains 1 to 3 mg of nicotine, a large proportion of which is absorbed by a smoker who inhales. The pharmacological action of nicotine varies with the dosage and varies somewhat in different individuals and under different conditions. The general effect of small doses is to stimulate the central nervous system and autonomic ganglia, which in turn has manifold secondary effects. Carbon monoxide is present in sufficient quantities in cigarette smoke to form several per cent of carboxyhemoglobin in the blood.

Experimental studies on human beings show that smoking has a number of acute effects on the circulatory system, including increase in heart rate, increase in blood pressure, and constriction of peripheral blood vessels. Cigarette smoking also produces changes in electrocardiograms and ballistocardiograms of some patients with coronary artery disease. There is strong clinical evidence that tobacco smoke has an extremely bad effect on patients with Buerger's disease, a disease of the blood vessels of the extremities. Other acute effects of smoking a few cigarettes include release into the circulation of hormones from the posterior lobe of the pituitary gland, increase in blood sugar, and increase in red blood cell counts and total blood cell volume.[25, 26]

Evidence from several clinical studies seemed to indicate that smoking decreases the effectiveness of treatment for peptic ulcers.[27-29] This has recently been verified by a well controlled clinical trial.[17] Experiments carried out on dogs indicate that, in the presence of histamine, exposure to cigarette smoke increases the proportion of animals that develop peptic ulcers.[30] The direct administration of nicotine with histamine has the same effect;[31] but cigarettes with most of the nicotine removed did not have this effect.[30]

Clinical evidence suggests that smoking may be an important cause of breakdown of healed or quiescent pulmonary tuberculosis in adults.[32]

Several investigators have exposed mice to tobacco smoke to determine whether it would increase the proportion of animals developing lung tumors. Considering the purpose of the investigations, the toxic effect of tobacco smoke on mice has been a source of annoyance. It has necessitated using a far lower concentration of smoke than is taken into the lungs by a person who inhales deeply and also usually necessitates using a very low exposure at the start in order to develop some degree of tolerance in the animals. The experience of Essenberg is an interesting example.[33] He exposed 36 mice to the smoke from 12 cigarettes per day for one year (or until death), while another 36 mice were kept under similar conditions but were not exposed to cigarette smoke. The author states that mice becoming ill or dying within the first two months were not included in the final results, which were presented as follows: (a) experimental group: 23 animals, of which 21 (91.3 per cent) developed lung tumors, and (b) control group: 32 animals, of which 19 (59.4 per cent) developed lung tumors. Essenberg interpreted these results as meaning that exposure to cigarette smoke increased the incidence of lung tumors in the exposed animals. Others have disagreed on the ground that, of the original 36 animals in each of the two groups, close to the same number (21 and 19, respectively) developed lung tumors.

The results of the experiment become clearer if the outcome for each animal is classified as positive or negative, positive being defined as dying or becoming ill within two months or developing a lung tumor. Thus classified, there were 34 (94.4 per cent) positives out of the

original 36 mice in the experimental group and 23 (63.9 per cent) positives out of the original 36 mice in the control group. This difference is statistically significant ($P < 0.002$). The results would at least appear to indicate that exposure to cigarette smoke is bad for mice of the strain used in this experiment. Essenberg also noted that the weight and growth rates of the experimental animals were appreciably lower than those for the controls. In a later experiment of the same sort, it was noted that the mice were much more active during periods of exposure to cigarettes than during periods when not exposed and that the control animals were relatively inactive during the entire period of the experiment.[34] This is reminiscent of the impression many people have of cigarette smokers compared with nonsmokers.

What is commonly called lung cancer is carcinoma which originates in the epithelium (i.e., lining) of the bronchial tubes. This is a delicate tissue normally consisting of one or two rows of simple basal cells on top of which is a row of ciliated columnar cells interspersed with mucus-secreting goblet cells. The action of the cilia moves a film of mucus upward through the bronchial tubes and the trachea into the mouth, where it is swallowed or expectorated. Thus, so long as the epithelium remains intact and the cilia perform their normal function, most of the dust, smoke particles, and other foreign matter which enter the lungs and fall on the bronchial epithelium are removed together with the mucus.

It has been shown experimentally that cigarette smoke inhibits ciliary action in the bronchial tubes and thereby interferes with the normal protective mechanism.[35] What component of cigarette smoke produces this effect is unknown. Histologic studies have also shown that the ciliated cells have been destroyed and replaced by nonciliated squamous cells in many small areas in the bronchial tubes of heavy cigarette smokers.[36] This combination of circumstances would presumably leave the bronchial epithelium of heavy cigarette smokers with less than normal protection from the possible effects of any foreign matter entering the lungs (e.g., bacteria, irritating dusts and fumes, or carcinogenic agents in dusts or fumes from any source).

A number of different chemical agents known as carcinogens can be used to produce cancer in experimental animals. Furthermore, it is well established that carcinogenic chemicals can produce cancer in man. Most frequently the cancer occurs at the site of exposure, but this is not necessarily the case. For example, a chemical used in the analine dye industry causes cancer of the bladder in workers exposed for many years. As a rule, cancer occurs only after long-continued exposure to a carcinogen; and histologic changes such as hyperplasia, metaplasia, and atypical cells usually appear before cancer develops.

Many years ago, when lung cancer was an extremely rare disease in the general population, it was found that a large proportion of all workers in certain mines in Germany died of this disease.[37] These mines are mined for uranium but contain many other minerals, including nickel, cobalt, arsenic, radium, and radon gas. Beyond any reasonable doubt, long and heavy exposure to dust and/or radon gas was responsible for the extraordinarily high incidence of lung cancer in these miners. There is also convincing evidence that lung cancer can result from long and heavy occupational exposure to at least several different dusts and fumes (chromates, nickel, certain gases).[37] Some investigators are convinced that many industrial dusts can have this effect and that general air pollution is also involved.[38] This evidence, coupled with the rapid rise which has occurred in lung cancer death rates during the past several

decades, leads to the theory: (1) that many different substances can produce lung cancer if inhaled in sufficient quantities over a period of many years, and (2) that the rise in the lung cancer death rate was attributable to increased exposure of the human population to some and perhaps many such agents. The suspected agents included industrial fumes and dusts of various sorts to which workers may be heavily exposed; general air pollution, particularly from motor vehicle exhaust; and cigarette smoking (all of which increased during the period of time under consideration). This led to intensive investigation of all the suspected factors.

Wynder, Graham, and Croninger have produced cancer on the skin of mice by the daily application for many months of material condensed from cigarette smoke.[39] A number of other investigators have now confirmed this finding, using rabbits as well as mice. Wynder and Wright have tested many different chemical fractions of condensed cigarette smoke on the skin of mice and report that most of the carcinogenic activity appears to be produced by one small fraction of neutral tar.[40]

Mellors [41] has made microscopic examinations under ultraviolet light of scrapings of tissue from the mouths of human subjects before and after smoking cigarettes. Tissue taken before smoking did not fluoresce, while tissue taken after smoking did fluoresce, the fluorescence being observed within the cells. Since certain components of cigarette smoke fluoresce under ultraviolet light, it appears that material from cigarette smoke actually enters cells of the buccal epithelium of smokers.

Auerbach, et al., have examined histologically large numbers of samples of bronchial epithelium of men who died of various causes.[36] In those who died of lung cancer (all of whom were smokers), a large percentage of the tissue samples showed changes such as basal cell hyperplasia, metaplasia, and areas of atypical cells which some pathologists interpret as carcinoma in situ. Exposure to most carcinogens and to some irritants produces such tissue changes. Heavy cigarette smokers who died of causes other than lung cancer showed about the same number and type of changes in the bronchial epithelium as did smokers who died of lung cancer. Relatively few such changes were found in the bronchial epithelium of nonsmokers. Chang [42] has reported similar findings.

Summary and Conclusions

Many investigators have expressed the opinion that cigarette smoking is an important factor in the causation of lung cancer (although it is not the only cause of this disease). The extensive epidemiological, experimental, pathologic, and chemical evidence on which this opinion is based has been summarized.

Two prospective studies, one British and the other American, on smoking in relation to death rates provided important evidence on the subject. In these two studies, it was found that the total death rate and the death rate from a number of diseases in addition to lung cancer are higher among cigarette smokers than among nonsmokers. Prominent in this respect were coronary artery disease, peptic ulcers, cancer of sites having direct contact with tobacco smoke products (i.e., buccal cavity, larynx, pharynx, and esophagus), and several lung diseases. It is possible that many diseases are involved, but this is not certain.

In a recent paper, Berkson says that he finds it "quite incredible that smoking should cause all of these diseases." [1] He therefore concludes that the evidence from the two prospective studies is suspect. This somehow seems to lead him

to believe that smoking has no influence on the probability of developing lung cancer.

I also doubt that smoking causes every one of the diseases for which the death rate of cigarette smokers was observed to be higher than the death rate of nonsmokers to a statistically significant degree. However, it is quite possible for a factor which has nothing to do with the original causation of a disease to increase death rates from that disease. The London fog of 1952 and influenza epidemics in the United States are cited as examples. Considering the chemical composition of tobacco smoke and the known effects of several of its components, it would not be surprising to find that chronic exposure to cigarette smoke has a multiplicity of harmful effects on the human body. A brief summary is given of the experimental, clinical, and pathological evidence bearing on the subject.

It was not the purpose of this paper to discuss the nature of the relationship between smoking habits and death rates from each and every disease which appears to be associated with smoking habits. The writer only wished to show that:

(1) The hypothesis that cigarette smoking may increase death rates from several different diseases is not inconsistent with the general body of biological and medical knowledge,

(2) There is considerable evidence (some would say convincing evidence) in support of that hypothesis,

(3) The hypothesis does not require the assumption that cigarette smoking is a factor in the original causation of all the diseases involved, and

(4) The fact that in two prospective studies the death rates from several different diseases are higher among cigarette smokers than among men who never smoked does not, as Berkson suggests, cast doubt on the theory that cigarette smoking is a factor of considerable importance in the causation of lung cancer.

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Fulbright Nursing Opportunities

The Institute of International Education calls attention to opportunities for American students in the field of nursing for study under the Fulbright Scholarship program. Countries in various parts of the world participate in the Fulbright program. In past years nurses have studied only in European countries but there are opportunities elsewhere for those with "a good knowledge of the appropriate language."

Application forms and further information about the 1959–1960 competition may be obtained from the U. S. Fulbright program, Institute of International Relations, 1 East 67th Street, New York 21, N. Y., or one of its regional offices in Chicago, Denver, Houston, Texas, San Francisco, and Washington, D. C.

A large reservoir of ornithosis was found in domestic turkeys in Wisconsin and Minnesota. This report indicates the need for studying the extent of human infections from this source. There is a clear inference that numerous human cases are not being detected, and that satisfactory methods of control are needed.

ORNITHOSIS (PSITTACOSIS): AN EPIDEMIOLOGICAL STUDY OF A WISCONSIN HUMAN OUTBREAK TRANSMITTED FROM TURKEYS

Rex E. Graber, M.D., M.P.H., and Benjamin S. Pomeroy, D.V.M., Ph.D.

THE HISTORY of human ornithosis transmitted from turkeys is a brief one. Since 1948 at least eight outbreaks have been authenticated in Texas,[1, 2, 3] involving illness in more than 300 persons, chiefly poultry workers. In 1954, in New Jersey,[4] 17 cases of ornithosis in poultry employees and laboratory personnel were attributed to contact with infected turkeys. Early in 1956, in Oregon,[5, 6] at least 87 persons in several industrial groups became ill with the disease as the result of exposure to infected turkeys.

These outbreaks were all of an explosive nature, with attack rates ranging up to 44 per cent in exposed groups, and case fatality rates as high as 13 per cent.[11] In the three states where the outbreaks occurred, human beings were exposed and infected before the original sources of infection were discovered in turkeys. In Texas and Oregon, the disease in turkeys was of epizootic proportions, affecting several flocks within a particular area. In the main, morbidity and mortality in the flocks were severe, indicating infective viral strains of high virulence. Viral isolates from flocks in the three states were also highly virulent to experimental mice.[7, 8, 9]

This paper reports the findings of two studies, one in turkeys and the other in human beings. The study in turkeys was begun late in 1954 by one of the authors (Pomeroy) as an investigation to determine whether ornithosis was prevalent in Wisconsin turkeys. After presumptive evidence of such prevalence was obtained, an independent project was begun early in 1956 under the direction of the other author (Graber) to investigate the hazard to workers in a turkey-processing plant. An interesting culmination of these studies was reached in the fall of 1956, when an outbreak among the workers was observed and ornithosis virus was isolated from turkeys.

A preliminary report of the human outbreak is in the literature.[10] This paper is the result of a joint effort by the authors to coordinate their separate findings and to present them as an epidemiological report.

Serological and Virus Isolation Studies in Turkey Flocks

Evidence of ornithosis in turkeys in the area began to appear late in 1954. In the field and laboratory studies conducted under the direction of Pomeroy, the first suspected flock was encountered in December of that year. Birds from this flock were showing respiratory symptoms and lesions suggestive of infectious sinusitis. Serum samples submitted elsewhere from this flock reacted positively in indirect complement-fixation inhibition (CFI) tests.[12] Although attempts to isolate ornithosis virus from the tissues were unsuccessful, further investigations were clearly indicated.

In the spring of 1955, personnel, laboratory facilities, and financial support from the Animal Disease and Parasite Research Division of the U. S. Department of Agriculture became available for a research project on ornithosis under Pomeroy's direction. One of the objectives of this project was to investigate the incidence of ornithosis. Since clinical evidence of the disease in manifest form was lacking, this had to be done largely by serological studies and on a selective basis because of the large number of flocks. Samples from prospective breeding flocks were selected for study for two reasons: First, blood samples were already being collected routinely for other serological tests in a program to eliminate, as breeding flocks, those which showed evidence of disease. Second, breeder flocks are subjected to greater physical stress than ordinary market flocks and therefore present more productive study material in the detection of disease.

As an additional part of the program a veterinarian was employed for field supervision of breeder flocks. He was also able to make observations on a limited number of farms raising market flocks. Thus, it was possible to select serological samples and other study material from this additional source.

The collection of data as a long-term project was begun in July, 1955. During the next two years, serological studies were made on samples from 124 flocks. The samples were selected at random from each flock and represented 5 to 10 per cent of the birds. The size of the flocks ranged ordinarily from 500 to 1,000 birds.

A modification of the standard technic [13] of the indirect or complement-fixation inhibition (CFI) test was used. End results showing less than complete hemolysis in titers of 1:8 were regarded as negative.

As an arbitrary screening procedure, flocks were classified as "negative," "suspect," or "positive" on the basis of results observed. Results obtained during two 12-month periods are summarized in Table 1.

Negative flocks were those in which no titers were found. Suspect flocks were defined as those in which titers of 1:8 and 1:16, and no higher, were

Table 1—Psittacosis CFI Findings Summarized in 124 Turkey Flocks, 1955–1957, Wisconsin

Sera	July 1, 1955–June 30, 1956		July 1, 1956–June 30, 1957	
	No. of Flocks	Per cent	No. of Flocks	Per cent
Negative	29	48.4	41	64.1
Suspect	20	33.3	11	17.2
Positive	11	18.3	12	18.7
Totals	60	100.0	64	100.0

observed. Positive flocks were those from which specimens showed one or more titers of 1:32 or higher.

As seen in Table 1, a most significant finding was that almost half of the flocks selected for serological study during the two-year period were showing presumptive evidence of ornithosis, based upon the serologic criteria mentioned above.

Virus Isolation and Special Studies

During the entire two-year study period, isolation attempts were made on 16 flocks, all of which were in the positive category as defined in the foregoing. These attempts were uniformly unsuccessful. The history of these flocks was negative as to unusual morbidity or mortality, although occasional transitory respiratory symptoms had been noted in some of them.

A longitudinal diagnostic study project, under controlled conditions, was planned on a flock which had shown such symptoms in the late summer of 1956. On September 5, sera were collected from a random sample of 50 birds from the flock. Of these, 35 reacted positively in CFI tests. Titers ranged from 1:8 to 1:128. These results appear in Table 2, reported from Farm A. A second sample of 51 birds from this flock was segregated for further study in October. Skin allergy tests for ornithosis were applied to the birds which resulted in 49 positive reactions. On October 22, the birds were started on a treated feed mixture containing 500 ppm of Aureomycin ®. This was continued until October 30, when the birds were taken to the plant to be processed under special observation. Blood was drawn at that time for testing at the laboratory. Serologic results of this testing appear in the second line of data in Table 2. Although there were fewer positive titers in the second sample as compared with those observed eight weeks previously, one should refrain from drawing conclusions as to the efficacy of the treatment because of the absence of controls.

The 51 birds were killed and evis-

Table 2—Farm Sources of Processed Turkeys with Serologically Positive Histories of Ornithosis, 1956, Wisconsin

Farm Source	Date Collected	No. of Sera	Negative	CFI Titer Distribution					Date Processed *
				1:8	1:16	1:32	1:64	1:128	
A	9-5	50	15	11	13	6	3	2	8-2, 8-25, 8-31
	10-30	51	31	12	5	0	1	1	10-24, 10-30, 11-6
B	11-5	2				1	1		9-27
C	9-25	50	50						10-9
	10-20	6	1			1	3	1	
	10-29	40	29	8	2	1			11-6
D	10-8	40	40						11-10
	11-5	2	0				1	1	11-15
E	11-12	20	6	5	6	1	2		11-26
F	10-15	40	35	3	2				
	11-12	35	9	19	5	2			11-28
G	11-29	40	30	8	2				11-29

* Includes all lots from farm.

cerated in the plant in the presence of Pomeroy and personnel from the U. S. Department of Agriculture. Critical inspection resulted in no rejections. Three of the birds showed slight lesions of the air sacs, which were not regarded with concern. Tissues selected at the time from the entrails of these birds subsequently failed to yield virus in the laboratory.

It was not until after this experiment that attempts at virus isolation were finally successful. One bird was selected from each of two market flocks in the early stages of respiratory infection. The two birds were destroyed on November 7, 1956, and virus from air sac tissues and sinus exudates was recovered from both. The isolates were identified by intraperitoneal passage in experimental mice. They were of low virulence and caused no mortality in the mice, but they did produce lesions of ascites and enlargement and necrotic areas of the liver and spleen, which appeared in 10 to 14 days and tended to disappear after two weeks. In experimental turkeys the isolates produced characteristic lesions of hepatitis, pericarditis and air sac infection. Antibody response in the laboratory turkeys was equivalent to that observed in the positive flock samples, thus confirming the impression of the positive significance of findings in that category.

As a control in studying antibody response in the laboratory, infectious sinusitis was artificially produced in experimental turkeys with an infectious agent other than the ornithosis virus. No psittacosis complement-fixing antibodies could be demonstrated in the controls.

Laboratory studies on the isolates also confirmed a tentative conclusion which had been derived from the studies on field turkeys, in that the prevalent strains were of low virulence and tended to disappear from tissues of the birds early in the course of infection. It was not felt, however, that latent infections could be ruled out by failure to isolate virus.

The Processing Plant

This plant is one of the largest of its kind in the Midwest. It processes several million pounds of turkeys annually. The birds are raised on more than 400 farms scattered over a large area of western Wisconsin and eastern Minnesota. Nearly 1,000 flocks are raised on these farms each year and are trucked to the plant in consignments or lots which number approximately 1,500 in an average year. As the turkeys reach the plant they are killed, eviscerated, and placed in cooling tanks. The following day they are packaged, boxed, and frozen, after which they are ready for shipment. Marketing outlets cover a wide area in the Midwestern and Eastern part of the nation.

The plant operates the year-round under veterinary inspection through a voluntary service furnished by the Agriculture Marketing Service of the U. S. Department of Agriculture. Two shifts of workers were employed during the last four months of 1956, when production was at its peak. During that time 248 persons were on the payroll. Some of the employees reside in the small city in which the plant is located, but the majority are recruited from the neighboring rural areas.

Human Study Project

Early in 1955, the plant manager had sought advice from his insurance carrier in establishing a program of health surveillance for his employees. The plant employed a full-time registered nurse but no physician. In April, 1955, with the cooperation of a local physician and the Wisconsin State Laboratory of Hygiene, blood specimens from 86 employees were tested by complement-fixation reaction

for antibodies of the psittacosis-lymphogranuloma group of viruses. The authors are indebted to Dr. W. D. Stovall for the findings in these tests. The results, which appear in Table 3, Series A, were considered to be inconclusive in that no high titers were found.

Up to the summer of 1956, no human ornithosis traceable to turkeys had been detected in the Wisconsin area. However, serological studies and field observations were producing indications of a mild or asymptomatic form of the disease in turkey flocks supplying the needs of the plant. Local practitioners were occasionally encountering human illnesses in the category of atypical or virus pneumonia. Usually mild and of short duration under antibiotic therapy, these cases were often considered to be of minor importance and were not being followed serologically to determine etiology.

In conference with the plant manager, the plant nurse, and an interested local physician, plans for an intensified program of surveillance were evolved. The need for prompt medical referral and adequate follow-up of cases of illness among the workers was emphasized. It was pointed out that ornithosis could easily be overlooked in mild cases where the patient may have recovered and returned to work before serological changes could be expected to develop.

It was deemed important to proceed as unobtrusively as possible in all investigative procedures in order to avoid undue concern on the part of the employees and the public which might react unfavorably against the industry. This precaution was observed throughout the entire study.

The first step was to organize a more comprehensive industrial health program within the plant which would include physical and serological examinations of the employees and the maintenance of health records. Thus it was possible at first to withhold from the employees the possibly alarming fact that detection of ornithosis was one of the immediate objectives of the program, and the plant nurse was able to begin the collection of classified information on employees, which proved to be useful in this epidemiological study.

Local physicians were interviewed to acquaint them with the project and to discuss problems of diagnosis and adequate follow-up. It was agreed that a case before acceptance should meet certain diagnostic criteria, based on the history and clinical and laboratory findings as follows:

1. Plausible epidemiological source of infection.
2. History of recent illness with symptoms and findings characteristic of viral respiratory or systemic infection.
3. (a) Fourfold rise in complement-fixation antibody titer in acute and convalescent blood sera.

(b) Conversion of negative to positive titers of 1:8 or higher after onset of characteristic illness.

(c) Observation of one or more titers of 1:32 or higher during convalescence from characteristic illness.

4. Careful consideration of the possibility of anamnestic reactions; and of the depressing effect of antibiotic therapy on antibody production in interpretation of item 3 preceding.

During the fall of 1956, as the pattern of the outbreak emerged, clinical data were furnished through the cooperation of eight physicians. In order that serological follow-up could be supervised, copies of all laboratory reports were sent directly to Graber.

The Human Outbreak

During a period of observation which extended from August 1 through December, 1956, the general health of the 248 plant employees was under close scrutiny. In total, 17 persons who became ill with acute febrile respiratory infections were investigated serologically. For 10 of these (see Table 4a), the diagnosis of ornithosis was con-

Table 3—Complement-Fixation Titers and Negative Results for Psittacosis in Two Mass Screening Surveys in Poultry Workers, Wisconsin

Result	Series A, April, 1955 *		Series B, November 6, 1956	
	No. of Workers	Per cent	No. of Workers	Per cent
Negative	76	88.4	187	83.9
1:8	9	10.5	23	10.3
1:16	1	1.1	2	0.9
1:32	..	....	5	2.2
1:64	..	....	5	2.2
1:128	..	....	1	0.5
Totals	86	100.0	223	100.0

* Furnished through the courtesy of Dr. W. D. Stovall, Director, Wisconsin State Laboratory of Hygiene.

firmed. In the remaining seven, serological follow-up failed to reveal the presence of psittacosis complement-fixing antibodies. All of the cases recovered satisfactorily. There were no relapses.

Soon after the diagnosis of ornithosis was established in the first two cases, a mass serological survey to determine psittacosis complement-fixing antibodies was made on blood samples drawn from 223 employees. This was done on November 6, 1956. The results are recorded in Table 3 as Series B, where they may be compared with results noted the previous year. All tests were made at the Wisconsin State Laboratory of Hygiene, using a psittacosis-type antigen prepared at the Rocky Mountain Laboratory of the Public Health Service. The titers recorded were the highest dilutions, showing a 4+ inhibition of hemolysis. Positive results in dilutions of less than 1:8 were in the main ignored and such results were recorded as negative.

Follow-up investigation of employees represented by the 13 titers greater than 1:8 in Series B revealed that six were convalescent or recently recovered cases with acceptable diagnoses of ornithosis. These cases are listed in Table 4a as Cases (1) to (4), (6), and (7). The remaining seven all gave negative histories of any illness even remotely resembling ornithosis during the preceding year or longer and most of them, including four with titers of 1:64, had been entirely healthy so far as they knew. It was concluded that these seven workers had experienced recent inapparent ornithosis virus infections. Two additional titers of 1:8 in Series B are also believed to indicate inapparent infections because they were in employees who had yielded negative tests the previous year. Although positive 1:8 titers were observed in 21 other employees in the 1956 survey, they were excluded because the finding was not deemed to offer sufficient evidence of recent infection in the absence of other supportive clinical and laboratory data.

Within the entire period of observation, the types of infection particularly investigated among the workers are summarized as follows:

Clinically manifest and serologically confirmed ornithosis 10 cases (Table 4a)
Inapparent infections of ornithosis, serologically confirmed 9 cases (Table 4b)
Respiratory infections, serologically negative for ornithosis 7 cases

Cases 8, 9, and 10 of the confirmed cases converted from negative to positive CF titers subsequent to the time of the mass serological testing on Novem-

Table 4a—Confirmed Cases of Ornithosis in Processing Plant Workers, 1956, Wisconsin

Infected Individuals	Sex	Age	Occupation and Departments *	Onset 1956	Psittacosis CF Titer (Reciprocal)		Clinical Manfestations
					Date	Result	
1—A.L.	F	38	Scraper E	8–15	8–25 9–18 11–6	32 32 16	Moderate
2—E.N.	M	59	Supervisor K	9–15	4–55 10–5 10–22 11–6	Negative 64 32 128	Moderate, insidious onset
3—C.P.	F	57	Feet remover K	9–12	9–17 10–8 11–6	Negative 16 32	Severe
4—G.H.	F	29	Pinner K	9–30	4–55 11–6	8 (partial) 64	Mild
5—J.W.	M	38	Helper K	10–22	12–21	64	Severe
6—R.L.	M	48	Leg sawyer E	10–23	10–29 11–6 11–15 12–28	Negative 32 16 32	Mild
7—V.N.	F	50	Pinner K	10–25	11–6 12–26	32 32	Mild
8—H.W.	M	57	Trusser	10–26	11–6 11–17 12–14	Negative 8 8 (partial)	Moderately severe
9—V.G.	F	50	Runs vacuum pump P	11–1	11–8 11–14 12–7	Negative 8 16	Severe
10—E.K.	F	37	Pinner K	12–2	11–6 12–4 12–10 1–2	Negative 8 (partial) 32 2 in 8	Mild

* Departments: K—Killing and defeathering
E—Eviscerating
P—Packaging
B—Boxing

ber 6, 1956. It is likely, therefore, that additional inapparent infections would have come to light had mass testing been repeated in December. However, this was not done.

In the epidemiologic considerations which follow, the nine inapparent infections are included along with the 10 clinically manifest cases. The seven negative cases are disregarded in further analysis.

Source of Human Infection

Since the dates of onset of the 10 confirmed cases extended over a period

Table 4b—Inapparent Infections of Ornithosis in Processing Plant Workers, 1956, Wisconsin

Infected Individuals	Sex	Age	Occupation and Departments *	Psittacosis CF Titer (Reciprocal)	
				Date	Result
11—A.J.	F	50	Pinner K	11-6	64
12—S.F.	F	50	Bird bagger P	April '55 11-6	8 32
13—F.Z.	F	37	Scraper E	11-6	64
14—N.K.	F	40	Pinner K	April '55 11-6	Negative 64
15—N.K.	F	37	Gizzard worker E	11-6	64
16—M.B.	M	19	Tray unloader B	11-6	32
17—M.D.	F	49	Pinner K	11-6	16
18—E.S.	F	35	Ventor E	April '55 11-6	Negative 8
19—S.W.	F	39	Gizzard machine E	1955 11-6 11-29	Negative 8 8

* Departments: K—Killing and defeathering
E—Eviscerating
P—Packaging
B—Boxing

from August 15 to December 2, 1956, it must be concluded that exposure was multiple. While person-to-person spread cannot be positively ruled out, such transmission of ornithosis is rare and does not seem likely, since no cases were observed in family contacts. All cases gave negative histories of exposure to psittacine birds. Although local physicians extended their alertness to ornithosis in the general population, no cases were detected other than in plant workers.

At no time during the period under study were birds accepted for processing which did not appear healthy. Nor were lesions of ornithosis ever detected in the organs of the birds by the veterinary inspector on the processing line. It is postulated that the source of infection was in apparently healthy turkeys harboring the virus at the time they were processed. Evidence to support this rests in the relation of the previously described serological and virological data on turkeys to the onset of the human infections.

Human Exposure to Turkey Virus

In reviewing the epidemiology of the human outbreak, it is evident that plant employees were subjected to multiple exposure.

An attempt was made to determine dates during the period of outbreak,

other than the previously described occasion on October 30, 1956, on which suspected flocks had been processed. From the plant records it was possible to identify birds accepted for processing only as lots or consignments from a particular farm. The authors felt that it was justifiable to ascribe a serologically positive history to all lots of turkeys coming from any farm which had produced one or more flock samples with positive findings during 1956. All such lots in the plant records and the producing farm were therefore looked upon with suspicion.

Such farms are listed in Table 2, as are dates on which flock samples had been collected for testing, together with the serological results on such samples. The dates on which various lots of birds from the farm were accepted at the plant appear in the final column. The exact relationship of these dates to the onset of cases is shown graphically in Figure 1. Each square symbol denotes a suspected lot of turkeys and each triangle marks the onset of a human case of ornithosis.

The incubation period of human ornithosis is generally stated to be seven to 25 days after first contact. In Figure 1 it can be seen with one exception that the dates of onset of the human cases were chronologically compatible with exposure to infection on dates when turkeys from suspected farms were killed at the plant. It may be of some significance that the four October cases could have had a single exposure on October 9. An extremely interesting fact is that one of the flocks killed October 9 came from a farm that produced a bird from which tissues taken on November 7 yielded ornithosis virus.

While Figure 1 depicts a striking sequence of events, conclusions as to cause and effect are not warranted without some reservation, since the lots and flocks of turkeys shown therein were only those with a known serological history. During the same period as that covered in Figure 1 the plant accepted from approximately 300 farms 987 lots of birds with an unknown history, inasmuch as flocks from these farms had not been serologically sampled.

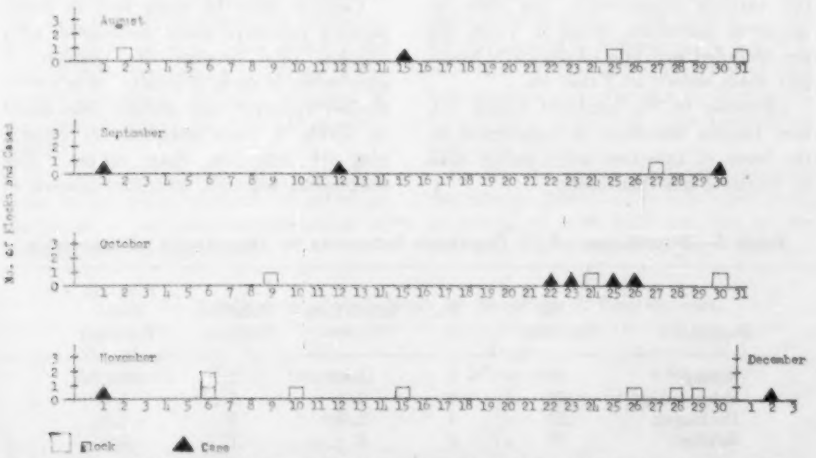

Figure 1—Distribution of Dates When Flocks with Positive Serological History Were Killed at Plant and Distribution of Onset of 10 Cases of Ornithosis in Plant Employees, 1956, Wisconsin.

Transmission of Virus to Plant Workers

In studying the mode of transmission of the disease from turkeys to plant employees, it is necessary to consider the tasks performed by the individuals in the various departments of operation. Thirty-three persons were employed in the office or in other miscellaneous positions not closely connected with the processing line. No infections or illnesses were observed in this group. Since only a few of them were tested serologically, the entire group is excluded from further consideration.

Specific tasks of the 215 remaining workers are grouped into the four major departments involved in modern poultry plant operation: (1) killing, which includes defeathering, (2) eviscerating, (3) packaging, and (4) boxing. Some of the packaging operations are carried out in the eviscerating room; otherwise, the various departments and some of the operations within departments are segregated in the physical structure of the plant.

In determining risk of exposure to ornithosis involved in individual jobs in the various departments, the nine inapparent infections, listed in Table 4b, are included with the 10 clinically manifest cases shown in Table 4a.

Likewise in the analyses which follow, human incidence is considered on the basis of infection rates rather than in terms of manifest cases.

From the infection rates in Table 5 it is evident that infection occurred to the greatest extent in the killing department, was less severe in the eviscerating department, and still less in the packaging and boxing departments. The probability of the high rate of infection observed in the employees of the killing department, as compared with those of the other departments, occurring by chance alone is less than one in a hundred, which is highly significant.

Within the four departments each employee has a station where he performs a specific task, as the birds are suspended and conveyed along the processing line. Several workers may be employed at the same task. For instance, there are 14 "pinners," who manually remove pin feathers in the killing department. As seen in Table 6, infection rates varied widely in different job categories. Fifty-one categories are listed in the killing, eviscerating, and packaging departments. Eighteen of the 19 infections were distributed among 10 of these categories. The sole remaining infection was found in a boxing department employee.

Caution must be excercised in interpreting infection rates associated with various jobs because the number of employees in each is small. It is nevertheless apparent that certain jobs listed in Table 6 were attended by greater risk of infection than others. The secretions, feathers, feet, and viscera of

Table 5—Distribution of 19 Ornithosis Infections by Department of Operation

Department	No. Employed	No. Ill	Attack Rate (Per cent)	Total No. Infected	Infection Rate (Per cent)
Killing *	41	6	14.63	9	22.0
Eviscerating	92	3	3.3	7	7.6
Packaging	52	1	1.9	2	3.8
Boxing	30	0	0	1	3.3
Total or average	215	10	4.7	19	8.8

* Includes defeathering.

Table 6—Distribution of 19 Infections by Job Category

Department	Job	No. Employed	No. Ill	Total No. Infected	Infection Rate (Per cent)
Killing	Pinner	14	3	6	42.8
	Killing room foreman and helpers	4	2	2	50.0
	Feet remover	3	1	1	33.3
Eviscerating	Leg sawyer	3	1	1	33.3
	Scraper	3	1	2	66.7
	Trusser	7	1	1	7.1
	Gizzard worker	17	0	2	11.8
	Ventor	3	0	1	33.3
Packaging	Bird bagger	6	0	1	16.7
	Vacuum packager	11	1	1	9.1
Boxing	Tray unloader	4	0	1	25.0
Total or average		75	10	19	26.7

infected birds are richly laden with virus. Indeed, feathers and feet of birds still healthy, though from an infected flock, may be heavily contaminated. As the birds are processed, there is abundant opportunity for air contamination by dust particles and other aerosols produced by spraying operations. This occurs chiefly in killing and defeathering and, to a lesser extent, in removing and handling viscera. Jobs showing the highest infection rates were those in the nearest proximity to such sources of air contamination in maximal concentration.

It was concluded, therefore, that infections in the plant workers occurred as the result of air-borne transmission of virus inhaled by respiration.

Other Factors of Exposure and Susceptibility

The plant began its annual double-shift operation August 29, 1956. On that date 82 new persons were placed on the payroll and entered plant employment for the first time. The infective agent had already appeared in the plant environment. The infection rate for that group is compared, in Table 7, with that of all other workers who had had employment previous to August 29 for varying periods of time ranging to over four years.

In the 82 newly employed persons the rate of infections was 6.1 per cent, as compared with 10.5 per cent in the 133 who had worked longer. The dif-

Table 7—Distribution of Infections by Duration of Employment

Length of Employment	No. Employed	No. of Infections	Infection Rate (Per cent)
New *	82	5	6.1
Other	133	14	10.5
Total or average	215	19	8.8

* Refers to persons first employed August 29.

Table 8—Infections Classified by Age Groups and Sex

Age Group	No. Exposed			No. of Infections			Infection Rates (Per cent)		
	M	F	Total	M	F	Total	M	F	Total
Under 20	12	2	14	1	0	1	8.3	0	7.1
20–29	12	18	30	0	1	1	0	5.5	3.3
30–39	17	34	51	1	6	7	5.9	17.6	13.7
40–49	19	53	72	1	2	3	5.3	3.8	4.2
50–59	14	25	39	2	5	7	14.3	20.0	17.9
60–69	6	3	9	0	0	0	0	0	0
All ages	80	135	215	5	14	19	6.3	10.4	8.8

ference is not significant at the 5 per cent level of confidence. The results of this comparison have only a limited value, since they fail to take into account the factor of job placement in the two groups. No evidence was obtained to indicate that those who had worked previously in the plant had acquired a degree of immunity not possessed by those newly employed. The history of human ornithosis transmitted from turkeys goes back only a few years, and the duration of immunity resulting from infection with turkey strains of virus is unknown. A few repeated infections have been observed elsewhere.[1, 12]

Workers were employed in two separate shifts on and after August 29, 1956. One clinically manifest case had developed before that date. The second case had an insidious onset, and exposure may have occurred prior to that date. The onset of the remaining eight cases can definitely be attributed to exposure subsequent to August 29. Five of these worked in the first shift and three in the second. Categorizing the inapparent infections by shift is not practical, since onset of occurrence and date of exposure could not be related chronologically with the double-shift operation in those who were employed before August 29.

Except for different hours, jobs and operations were the same on both shifts. Furthermore, in many instances the same birds were handled by both shifts. There is no reason to believe that specific susceptibility or exposure factors were inherent in either shift.

In age and sex groups in Table 8, where the numbers are large enough to apply tests no significant differences in infection rates are found at the 5 per cent level of confidence.

Table 9 correlates infection rates by

Table 9—Infections Classified by Department of Operation and Sex

Department	No. Exposed			No. of Infections			Infection Rates (Per cent)		
	M	F	Total	M	F	Total	M	F	Total
K	25	16	41	2	7	9	8.0	43.8	22.0
E	25	67	92	2	5	7	8.0	7.5	7.6
P	12	40	52	0	2	2	0	5.0	3.8
B	18	12	30	1	0	1	5.6	0	3.3
All departments	80	135	215	5	14	19	6.3	10.4	8.8

sex with the department of plant operation in which the individuals worked.

There was no significant difference in the infection rates by sex in the total of all departments, nor between males in the killing department compared with all other males. However, there were striking differences in rates between females (43.8 per cent) and males (8.0 per cent) in the killing room, as well as between females in the killing room (43.8 per cent) and all other females (6.0 per cent).

These latter differences appear at first sight to indicate a difference of susceptibility in the two sexes. However, they are readily explained by the fact that all the pinners, who work exclusively in the killing room and among whom there was a high rate of infection, were women. There is no evidence that either men or women are more susceptible when working in the same environment.

Discussion

It is noteworthy that the investigations described in this report received their original impetus from the industry rather than from a health agency. Concern over the earlier Texas experience was the motivating factor, along with a desire to profit by that experience and to prevent, if possible, a similar occurrence in Wisconsin.

Although the latter objective was not fully attained, there were some attendant benefits in that there was a state of preparedness which cushioned the impact of succeeding events. In other respects, too, the Wisconsin experience was different from that of the three other states in which industrial workers had been involved. Prior to and during the year which followed the human outbreak, severe epizootics of ornithosis in Wisconsin turkeys had not been observed despite three years of close surveillance. Nor had other human infections from a turkey source ever been recognized. It was apparent that highly virulent ornithosis virus was not in the ecological picture. The human outbreak, therefore, could not have been surely predicted on the basis of any past experience, even after the authors' studies had begun to point out conclusive evidence of mild and inapparent ornithosis in turkeys undoubtedly caused by a virus of low virulence. While ornithosis virus strains of low virulence had been recovered from turkeys in other states, human illness resulting from exposure to such strains had never been reported. The 10 cases reported here are believed to be the only ones on record from such a source.

Since the infective agent was not isolated from the human cases, definitive proof of its serotype is absent. There can be little doubt, however, that it was identical to the two isolates obtained from turkeys on November 7, 1956. This conclusion is based on (1) the clinical, serological, and experimental evidence of the widespread prevalence of homologous ornithosis virus strains in turkey flocks, (2) the lack of evidence of a more virulent heterotype in the ecological picture, (3) the epidemiological evidence of the mode of transmission through industrial environmental factors which governed the human incidence, and (4) the relative mildness of the human outbreak.

The turkey prototype showed low mammalian virulence in the laboratory. In arriving at conclusions as to human virulence, one should not draw too heavily on the meager clinical study material furnished by only 10 cases. However, the attack rate of the 10 cases, even when applied only to those most intimately exposed, was low as compared with other human outbreaks caused by intensely virulent ornithosis virus. Some indication of low virulence may be seen in the nine inapparent infections and in the relative mildness of most of the 10 illnesses. On the other hand, the sever-

ity of three cases was by no means negligible. The combined disability of these, in spite of tetracyclene therapy, resulted in a total of 20 patient days of hospitalization and 47 man days lost from work.

Medical care for the 10 cases was furnished by physicians residing in five widely separated communities. Clinically the cases were indistinguishable from other febrile respiratory infections such as are commonly encountered in a rural medical practice and for which laboratory tests for viral etiology are infrequently requested. If the physicians had not been alert to the study project, it is highly probable that the outbreak would have been completely overlooked.

Soon after the diagnosis of the first three cases was confirmed and reported to the plant management, all practical precautions were taken to prevent the marketing of infected birds. The difficulty was in recognizing inapparent and latent infections. Numerous attempts to isolate virus from seropositive birds had failed. In spite of this difficulty, beginning in mid-October all flocks known to have a seropositive history were treated with antibiotics before they were marketed. They were placed on a feed mixture containing aureomycin, 400 ppm, for at least eight days before being shipped to the processing plant. This treatment was applied to all turkeys shown in Figure 1 to have been killed at the plant on and after October 24, 1956. From our information no conclusions can be drawn about the efficacy of the procedure as a safety measure for employees.

Summary and Conclusions

A large reservoir of ornithosis was found in domestic turkeys in western Wisconsin and eastern Minnesota. Infections were largely subclinical but were occasionally manifested by transitory respiratory symptoms. Isolates from two turkey flocks were identified as ornithosis virus serotypes of low virulence to experimental turkeys and mice.

Almost two years after the turkey study project had been initiated, a human outbreak of ornithosis was observed. The outbreak was confined to workers in a turkey-processing plant located in the same area. Ten clinically manifest cases were serologically confirmed, as were nine inapparent infections.

The dates of onset of the respective cases occurred over a protracted period, indicating that plant workers were subjected to multiple exposure.

Epidemiological studies indicated that the disease was transmitted to plant workers from turkeys harboring infection at the time they were processed.

The incidence of infections in the plant workers was of a selective nature, depending upon the hazard associated with individual jobs. The hazard was that of air-borne transmission of virus in dust particles and other aerosols produced by spray. This hazard was present to the greatest extent in the killing department, where most of the infected workers were employed.

Shift of operation and duration of employment were not found to be specifically related to the incidence of infections.

Differences of susceptibility because of age or sex could not be demonstrated.

Evidence based on epidemiological, experimental, clinical and ecological considerations indicated that the human infections were caused by virus strains identical in serotype with those of the turkey isolates.

The 10 cases reported herein are believed to be the first on record as demonstrating that turkey ornithosis virus strains of low virulence are capable of causing disease in man. It is the hope of the authors that this finding will

be of interest to the pioneer workers in ornithosis research, who have long suspected the existence of such a hazard. It is also hoped that this report will provide added stimulation to others who are interested in working out satisfactory methods of control.

ADDENDUM—Since this paper was submitted for publication, three additional cases of ornithosis have been observed in plant employees. Of striking interest is the fact that a fourth case occurred in a person whose sole source of exposure was from turkeys on a farm. In the meantime, virulent ornithosis in turkeys has not been observed.

ACKNOWLEDGEMENTS—These investigations were supported by the College of Veterinary Medicine, University of Minnesota; the Wisconsin State Laboratory of Hygiene; the Wisconsin State Board of Health; and the Animal Disease and Parasite Research Division, U. S. Department of Agriculture. Recognition is extended to the management of Badger Turkey Industries, Barron, Wis., for their wholehearted cooperation in the conduct of the studies; to Dr. C. J. Strang and his colleagues for their cooperation in supplying clinical data derived from their professional services; to Norma Loeffler for her assistance in the statistical evaluations; to Dr. Helene Brumfield and Henry Bates for their assistance in conducting the laboratory tests on the turkeys.

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Medicine, Public Health, and the Law

The Pittsburgh Graduate School of Public Health has established a health law center to carry on "studies concerning the legal aspects of medicine, dentistry, nursing, public health, hospitals, and medical care." In addition to a long-range program of teaching and research, the center will serve as a clearing house for legislative and other legal matters in the health fields.

A research team, under the direction of John F. Horty, Jr., has been conducting a hospital law research study with the support of the National Institutes of Health. Mr. Horty is directing the new center.

Should a virus diagnostic service be made available on a local basis? This report demonstrates that this is not as formidable a project as one might imagine. Such a service can be made available even on a small budget, if the interest exists, and can be of great value to the public health officer and the clinician.

DIAGNOSTIC VIROLOGY SERVING THE COMMUNITY

Thelma N. Fisher, Ph.D.

IN TERMS OF SERVICES to the community, the contributions of the large hospital or public health diagnostic virus laboratory may be many, particularly when this hospital or local health department is located in a large city. The following account summarizes certain experiences and types of information obtained during the initial 15-month service period of the Diagnostic Virus Laboratory at the Charity Hospital in New Orleans.

The Functional Virus Laboratory

Formation of an operating laboratory unit first requires space and the outlay of funds for equipment and minimal requirements have been adequately listed elsewhere.[1, 2] Once basic items have been purchased, the monthly cost of expendable materials may be reduced to a consistently low level. For example, we allotted $340 for our monthly expendable budget, to be divided in the following manner: $60 for 1,330 pounds of dry ice; $50 for 56 dozen fertile eggs; $90 for 200 tubes of monkey kidney cells; $140 for other items such as antigens and glassware.

A ready source of tissue culture materials, embryonated eggs of various ages, and white Swiss mice must be available at all times for virus isolations. Regarding culture media for mammalian cells, Hanks' basic salt solution is easily prepared and serves as the basal fluid for Eagle's medium, the medium of choice for many types of tissue culture cells. Sterile concentrates of amino acids, vitamins and glutamine, all constituents of Eagle's medium, may be purchased from Microbiological Associates, Bethesda, Maryland. Ten per cent serum is presently the minimal serum concentration required for growth of HeLa and many other cell lines. A large hospital should have no difficulty obtaining serum without charge. If one supplies the blood bank with sterile evacuated flasks containing no anticoagulant, the bank staff is frequently very cooperative in providing an occasional pint of blood from which the serum may be removed. The sterile flasks may be obtained commercially. Initial tissue culture cell lines may be purchased commercially or secured from investigators engaged in tissue culture work in nearby laboratories. A ready source of fertile eggs is also a local problem. Generally, at least one poultry farm in a given area is willing to sell fertile eggs to scientific institutions for a fee of approximately 90 cents per dozen. Maintenance of a small white Swiss mouse colony by each

laboratory is easily and inexpensively accomplished, especially if one is able to obtain a healthy pair of animals from another laboratory in the vicinity. It is interesting to note that fertile eggs, tissue culture cell lines, and Swiss mice have for all practical purposes eliminated the necessity of housing large laboratory animals for virus isolations, thereby greatly reducing this portion of the yearly budget.

Though procedures for virus isolation and identification may be modified to suit a given need, the 1956 edition of "Diagnostic Procedures for Virus and Rickettsial Diseases" [2] is considered the chief reference source by most diagnostic virologists. When the information it contains proved inadequate or required clarification or elaboration, we found the scientific personnel of the Virus and Rickettsia Section of the U. S. Public Health Service at Montgomery, Ala., a friendly advisory group and always a source of worthwhile information regarding procedures or methods pertaining to various types of animal virus studies.

Essential to the successful operation of a diagnostic virus laboratory is a staff composed of intelligent, well trained and zealous employees. Skilled technicians adept in the technics of a relatively new field are rarely available, so that an elementary training program must be completed as quickly as possible. An additional two to three weeks' training period offered twice a year at the Communicable Disease Center, Montgomery, Ala., is available to technical personnel interested in learning procedures for the isolation and identification of viruses. Our original staff consisted of a supervisor, one technologist, and a woman to wash and assemble tissue culture glassware, as well as a man to tend animals and assume the duties of a porter. As the volume of work increased we were able to employ a second technologist, another woman to wash glassware, and a secretary. This enlarged staff proved to be adequate for our particular needs.

Laboratory Findings

In general, laboratory diagnostic reports include serological data as well as information obtained from virus isolation and identification procedures. In our laboratory, occasionally viruses were isolated from suspected specimens, but identification by neutralization tests was not made, since type-specific antisera were not commercially available. We found this to be particularly true for ECHO and adenovirus isolates. Certain manufacturers are currently engaged in the process of preparing these antisera and possibly they will be available to virus laboratories by the time this paper is in print. If not, for the present, one must do without, since the few research organizations preparing their own antisera against a specific agent generally are unable to house enough rabbits to produce antisera for themselves and interested colleagues.

When viruses were recovered from appropriate samples and a fourfold rise in complement-fixing antibody titer was demonstrated by examination of paired sera, the tests were considered diagnostically significant for recent recovery of the patient from a given virus infection. If acute and convalescent serum specimens alone were obtained from the patient and at least a fourfold rise in complement-fixing antibody titer was demonstrated, the tests were still considered significantly positive as evidence of recent infection. This was thought to be particularly true if cross-reactions with other viral antigens were not encountered or if such reactions occurred at low serum dilutions. Isolation of a virus from a given patient in the absence of a rising antibody titer was considered incomplete evidence for implication of this isolate.

Positive Results

The Virus Laboratory of Charity Hospital was officially ready to accept specimens on October 1, 1956. During the first 15-month period samples from patients were carefully screened and only those retained where clinical findings warranted virus studies. This was accomplished by frequent consultations with medical staff members. These selective measures were enforced in order to conserve expensive materials and reagents, as well as to budget the limited time of laboratory workers. During this testing period, specimens for laboratory examination were taken from 403 patients and 23 per cent of these cases were found to be associated with viral infections as measured by the criteria mentioned previously. An additional 8 per cent of the cases studied did not completely fulfill all the criteria[2] for definitive implication of viral etiology but instead were designated presumptive positives because of the suggestive, though incomplete, data obtained. Positive findings are recorded in Table 1.

Table 1—Incidence of Certain Viral Agents Observed During the Period October, 1956, to January, 1958

Virus	Positive	Presumptive Positive [a]
Adenovirus	3	4
Coxsackie	6	..
Eastern equine encephalomyelitis	2	2
ECHO 9[b]	3	..
Herpes simplex	15	10
Influenza (Types A and B)	27	10
Influenza (Asian strain)	3	..
Mumps	7	4
Polio (Type 1) [c]	21	..
Psittacosis	1	1
Vaccinia	1	..
Viruses not identified to date [d]	5	..
Total number patients tested in 15 months	403	..

a. Presumptive positive: Observations incomplete, but positive so far as tested.
b. ECHO 9 viruses conclusively identified by Dr. Wolfgang Henigst, Department of Tropical Medicine and Public Health, Tulane School of Medicine.
c. Dr. Donald E. Carey, Department of Tropical Medicine and Public Health, Tulane School of Medicine, acted as liaison officer between patients and the laboratory for the polio testing program.
d. Unidentified viruses isolated from stool specimens in monkey kidney tissue cultures, to be identified when appropriate antisera are available.

It may be worth while to consider the types of viruses isolated from patients residing in the New Orleans area who remained under care in a large general hospital for the duration of their illness. Data in Table 1 confirm the fact that Eastern equine encephalomyelitis virus continues to manifest itself as a human disease in Louisiana and its prevalence probably warrants further investigation. At least one of the patients in this study experiencing a severe encephalitis due to Eastern equine virus recovered completely without apparent residual effects. We know relatively little concerning subclinical or mild manifestations of the disease if such exist. At present the cost of specific antigen may prohibit large survey experiments to obtain serological evidence of the presence or absence of complement-fixing or neutralizing antibodies in sera of normal individuals.

The virus of herpes simplex was frequently isolated from infectious processes of rather obscure nature such as Kaposi's varicelliform eruption, primary and recurrent vesicles at the site of an abrasion, encephalitis, conjunctivitis, and others. Lesions of the cold sore, fever blister group were completely excluded from these studies. Conjunctival involvement of the eye without typical manifestations seems to be more important than formerly suspected and bears further investigation. Herpes simplex encephalitis was observed in two patients and the virus recovered from brain tissue at autopsy.

During the past year Asian influenza virus infections played an important role

in most community life. We tested only members of the hospital staff ill with symptoms suggesting influenza virus infection, since a large public health program to study the epidemiology of this disease in New Orleans was under way. Even so, 25 Group-A influenza virus infections were observed and three of these were conclusively identified as Asian strain influenza virus.

It will be noted that Type-1 poliovirus was isolated and identified from 21 different patients. Coxsackie and ECHO viruses were recovered from stools of other patients classed in the category of aseptic meningitis. Mumps virus was implicated as the responsible agent for encephalitis in three or four patients. Adenoviruses were undoubtedly the cause of many respiratory illnesses seen in clinic patients. Since in most instances the severity of the disease did not justify hospitalization, the seven cases reported in Table 1 do not reflect the prevalence of adenovirus infections in this area. Undoubtedly many specimens potentially positive for viruses were never sent to the virus laboratory, possibly because of failure to recognize clinical symptoms suggesting viral etiology or because so many clinic and house patients are seen daily by the medical staff that adequate attention cannot be given those displaying only mild symptoms. Renewed emphasis has been placed on the proper collection of laboratory specimens in order that hospital staff members and public health officials may realize a greater return of positive findings. The laboratory will then be able to handle an even larger volume of suspected material effectively.

Value of Recorded Findings and Future Aims of the Laboratory

There are many obviously worthwhile returns to be gained by evaluation of suspected materials for the presence or absence of viruses. Isolation of the patient, in certain instances treatment of the patient with chemotherapeutic substances, immunization of members of the community—all have immediate significance in curbing the spread of infectious agents and in curing the patient. Where cause of the disease is very questionable, as in cases of aseptic meningitis or encephalitis, sharpening the clinical judgment has very definite beneficial effects, since adequate diagnosis should be accomplished before treatment is initiated. Our group spent 15 months attempting to serve the hospital staff and to determine whether a fair percentage of positive results could not be realized from a diagnostic virus testing program. We believe that we did this. Once a given virus laboratory has proved itself qualified to isolate and identify known viruses, it may then feel free to explore diseases of unknown etiology and to try to isolate new agents in instances where viruses might possibly be involved.

We have found that the hospital virus laboratory may offer a number of particularly valuable services to the physician, chiefly because it is immediately available. Many specimens obtained for virus isolation should be inoculated into appropriate tissues within 30 minutes or less following removal from the patient. Such procedures are not feasible if materials must be frozen and shipped long distances to sectional laboratories. The very fact that samples may be handled quickly in the hospital laboratory facilitates realization of a higher percentage of positive results. A closer understanding of the patient's individual problems also permits special investigations which would not be feasible from a more distant testing site. We have found that incomplete or presumptive positive data may be of great benefit to the physician in supporting a diagnosis when complete samples cannot be obtained. Frequently it is difficult to meet the standards necessary to report significantly positive results, since the

patient may not be examined within the first three days after onset of symptoms, so that specimens for virus isolation and examination of acute-phase serum cannot be taken. Nevertheless, convalescent serum exhibiting a high titer may be helpful in suggesting the probable cause of a recent illness. The presumptive positive finding is a tool with which the hospital virus laboratory can quickly assist the physician, while more remote public health units may of necessity be forced to discard incomplete specimens, such as a single serum sample, for serological tests. Yet, whenever possible, adequate sampling is urged since inconclusive laboratory testing can sometimes give false answers to diagnostic questions.

Aside from the direct diagnostic service to the attending physician, many epidemiological benefits may be gained by a thorough statistical analysis of both positive and negative data obtained for a given hospital or area throughout the years. It is our feeling that basic research must not be neglected. A better understanding of host-virus relationships with treatment of the patient as the ultimate goal should be the underlying purpose of all our endeavors.

Summary

Requirements for a functional hospital diagnostic virus laboratory are briefly described. The types of information obtained in the initial 15-month operation period of such a laboratory are discussed. Out of 403 selected cases of illness studied, 23 per cent of these were found to be caused by viruses. An additional 8 per cent of the cases were reported as presumptive positives, since the data were incomplete but highly suggestive of a viral etiology. The importance of diagnostic virus findings to both the physician and the public health officer are discussed.

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This survey of enteric infections in an Alaskan Eskimo group points to two types of Shigella flexneri as the major culprits. The agents are apparently kept in circulation by person-to-person spread within and among families.

A BACTERIOLOGICAL AND PARASITOLOGICAL SURVEY OF ENTERIC INFECTIONS IN AN ALASKAN ESKIMO AREA

H. J. Fournelle, Ph.D.; Ida Lucille Wallace, M.S.; and Virginia Rader

DIARRHEA CONTINUES to be reported as a major health problem among the Alaskan white and native populations. There is, however, little specific information about diarrheal illnesses among the native people, especially regarding the causative agents. In a review of intestinal infections in the arctic environment, Babbott, et al.,[1] summarized what little is known in Alaska, pointing out that while knowledge concerning such infections in the territory is incomplete, the problem is greater than is indicated by official reports.

In studies of Eskimos at Wainwright and in the Bethel area, Gordon and associates[2] found diarrheal diseases occurring throughout the year, most commonly among the younger age groups, with Shigella flexneri isolated most often. Endamoeba histolytica was not found. A carrier rate of 3.1 per cent of fish tapeworm was noted. No bacterial pathogens were found in dog feces. Fournelle[3] gave an account of problems encountered in the field while carrying out an enteric survey in Alaska. In summarizing some of his early findings, he stated that diarrhea occurred frequently, with the highest rates during the summer months, and that the problem appeared to be one of shigellosis involving mainly the young children. The recent report of Cullison and Davis[4] regarding Eskimos at Barrow showed a seasonal variation in the isolation of Salmonella typhimurium, with approximately a 100 per cent increase in isolations in summer over that found in winter. Frequency of isolation was high in all age groups. In 1957, Douglas[5] investigated diarrheal outbreaks at Fort Yukon and Arctic Village, Alaska; however, no Salmonella or Shigella were isolated.

Very little is known about human enteric parasitic infections in Alaska, other than the reports of Hitchcock.[6, 7] She showed the prevalence of E. histolytica among Eskimos at Bethel in 1949 and at Kotzebue in 1950 to be 3 per cent. The prevalence of nonpathogenic protozoa was said to be similar to that of the general population in the northern United States. Diphyllobothrium sp. was found in 15 and 6 per cent of the residents of the two villages, and Enterobius vermicularis in 58 and 43 per cent of their respective populations.

The present survey of enteric infections in the Eskimo population of the lower Kuskokwim River area in south-

western Alaska was initiated in August, 1955. Information desired included: (1) prevalence of diarrhea and of bacterial and parasitic agents, (2) age groups involved, (3) time of year of occurrence, and (4) identity of bacterial and parasitic agents. Procedures and technics have already been given.[3] In general, a single fecal specimen per individual (human and canine) was examined. Specimens were cultured in the field, and suspected bacterial pathogens were isolated and held for further study in the Anchorage laboratory. Specimens for parasitological examination were placed in MIF fluid[8] and held until return to the laboratory, with examinations made at a later date.

Ten villages were visited between August, 1955, and September, 1956, which were in coastal, tundra, and river locations. Populations ranged between 48 and 650 per village, with an estimated total of 2,378. Nine fish camps, located over a 12-mile stretch on the Kuskokwim River between Bethel and Napakiak, were visited in August, 1956. The people who live in these camps for two to three months each summer come from coastal and tundra villages. Camp populations ranged between 24 and 160, with a total of approximately 638. Interviews were held in 312 village dwellings during August–November, 1955 and July–September, 1956; and in 96 fish camp tents during August, 1956. Interviewing was started at one end of the village or fish camp and carried out progressively in every occupied house or tent in the community, with exceptions in the two largest villages, where about 80 per cent of the dwellings were visited. Usually the mother supplied the information about the family. Specimen containers for each member of the family were left with instructions to bring the specimens soon after they were passed to the field laboratory. In the interviews, a simple definition of diarrhea (Eskimo = anartok) was used, since most often the exchange of information was through an interpreter. Diarrhea was described as consisting of at least three or four stools a day and lasting for at least three days. The interviewee was also asked about the consistency of the stool. Although more information regarding symptoms was sought, it proved difficult to get anything worthwhile, and as a result this information was not complete. However, it was possible to find out more about symptoms when the interviewee understood and spoke English. The matter of language difference was not as great a problem as might be expected, since the field investigator was usually provided with a capable interpreter. On the whole, the Eskimos were very cooperative.

Findings

Reported morbidity for diarrhea and infection rates for bacterial pathogens, according to age groups, are shown in Table 1 (village and fish camp data are combined). Interviews were held with 1,669 individuals from the villages and with 544 from the fish camps, or approximately 70 and 85 per cent of the respective total populations. Of those giving a history of diarrhea, 582 were from the villages and 164 from the fish camps. (Most cases were reported as occurring during the four-month period prior to the interview and very few went beyond January, 1955.) Frequency of diarrhea in the villages ranged between 16.9 and 57.3 per cent and averaged 34.9 per cent, while in the fish camps the range was between 6.5 and 65.0 per cent and the average was 30.1 per cent. Frequency of attack was highest in the youngest age groups, where it was found that 55.9 per cent of children under 10 had diarrhea and accounted for 67.2 per cent of total cases. There were more cases of diarrhea in females (406/1,113) than in males (340/1,110), with frequency of attack

Table 1—History of Diarrhea and Pathogenic Bacterial Infections, Rates by Age Groups, August, 1955, to September, 1956

Age Groups	No. of Individuals in Interview	Individuals Giving History of Diarrhea		No. of Fecal Specimens Examined	Specimens Positive for Bacterial Pathogens	
		No.	Per cent		No.	Per cent
Under 1 year	82	51	62.2	64	4	6.3
1–4 years	430	288	67.0	324	17	5.2
5–9 "	384	162	42.2	320	20	6.3
10–19 "	459	90	19.6	333	10	3.0
20–29 "	279	44	15.8	181	2	1.1
30–39 "	193	39	20.2	144	1	0.7
40–49 "	153	28	18.3	117	1	0.9
50–59 "	45	12	26.7	35	1	2.9
60–69 "	36	6	16.7	30	0	0
70–79 "	24	10	41.7	22	0	0
80–89 "	2	1	50.0	2	0	0
Unknown	126	15	11.9	94	1	1.1
Total	2,213	746	33.7	1,666	57	3.4

36.5 and 32.4 per cent, respectively. With reference to the recency of reported diarrhea at the time of interview, 39.0 per cent of the cases reported in the villages were said to have taken place within the month, while in the fish camps this figure was 47.8 per cent.

Bacteriological examinations were made on 1,666 fecal specimens, 1,253 of which were from villages and 413 from fish camps (Table 1). Of the 57 specimens positive for bacterial pathogens, 48 came from seven villages and nine from four fish camps. Village and fish camp rates ranged between 0 and 11.2 per cent and between 0 and 3.7 per cent, with averages of 3.8 and 2.2 per cent, respectively. The highest rates were in children under 10 years, in whom the combined zero to nine year age group rate was 5.8 per cent. Few bacterial pathogens were isolated from people over 20, and these only in the villages. While the over-all infection rate was 3.4 per cent, the zero to nine age group accounted for 71.9 per cent of all infections. It was noted that 38 (66.7 per cent) of the 57 individuals from whom bacterial pathogens were isolated reported diarrhea, whereas 708 (44.0 per cent) of the 1,609 individuals from whom bacterial pathogens were not isolated reported diarrhea. The infection rate was slightly higher in males (3.5 per cent) than in females (3.4 per cent). With reference to the recency of diarrhea in the 38 who did report it, 21 (67.8 per cent) of the village cases said they had had it within the month prior to interview, while all seven positives in the fish camps also reported it during the same period. Multiple bacterial infections among people living in a single dwelling were few and were all due to a single pathogen.

Monthly occurrence of reported cases of diarrhea is shown in Table 2. Frequency was greatest during July and August, when 51.7 and 82.3 per cent of the cases in the villages and fish camps, respectively, were reported. In the village tabulations, it was noted that the largest number of reported cases of diarrhea appeared during the month of interview or the month(s) immediately prior to it. In the fish camp tabulations,

Table 2—Number of Cases of Reported Diarrhea, by Month of Occurrence, January, 1955, to September, 1956

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Unk *	Total
Villages	1		4	9	35	41	147	154	98	52			14	582
Fish Camps	1			3	6	12	80	55					7	164
Total	2		4	12	41	53	227	209	98	52			21	746

* Date unknown.

the greatest number of cases were reported during the month prior to interview and the next largest number was during the interview month. These results in part probably indicate that remote episodes were less likely to be remembered than recent episodes of diarrhea.

Bacterial Pathogens

Five bacterial pathogens were isolated and identified from the 57 positive specimens, as follows:

Bacterial Pathogens	No. of Times Isolated
Salmonella typhosa, phage type N	3
Shigella flexneri 2a	17
Shigella flexneri 3	34
Escherichia coli, 055:B5	2
Escherichia coli, 0111:B4	2

The pathogenic Escherichia coli types were taken from children one year of age and younger, two of whom were having diarrhea at the time of the interview. In two villages, only one pathogen was found, S. flexneri 3, in 11 and 18 individuals, respectively. In other villages where pathogens were isolated, either two or three different types showed up. In the fish camps, pathogens consisted of two types, S. flexneri 2a and E. coli 0111:B4, and in one of these camps both pathogens were isolated from an eight-month-old girl.

Out of a total of 278 canine fecal specimens examined (village, 226; fish camp, 52), only one bacterial pathogen was found, S. flexneri 3. This was in the village having the highest human infection rate and it was the only pathogenic type isolated in that village.

Parasitic Infections

Parasitological examinations were made of 1,680 human and 289 canine fecal specimens, derived as follows: village, 1,261 human and 234 canine; fish camp, 419 human and 55 canine. Most specimens were examined by the MIF direct [8] and concentration technics.[9] The results of examinations in human beings for total parasites, E. histolytica and Diphyllobothrium sp., according to age groups, are shown in Table 3 (village and fish camp totals are combined). In general, infection rates appear to be fairly uniform for all age groups, although the rates for children under 10 years were somewhat lower than those for other age groups. Rates for total parasites, E. histolytica and Diphyllobothrium sp., for the 0–9 age group were 36.8, 1.4, and 5.8 per cent, respectively. Infections were higher in males than in females for total parasites (43.4/40.1 per cent) and Diphyllobothrium sp. (12.4/9.1 per cent), while they were higher in females than in males for E. histolytica (1.8/1.5 per cent).

The results of the parasitological examinations are shown in Table 4 (the total figures represent both single and multiple infections per individual). Significant human protozoan and helminthic

Table 3—Parasitic Infections, Rates by Age Groups, August, 1955, to September, 1956

Age Groups	No. of Fecal Specimens Examined	Fecal Specimens Positive for— Total Parasites		E. histolytica		Diphyllobothrium sp.	
		No.	Per cent	No.	Per cent	No.	Per cent
Under 1 year	66	14	21.2	0	...	0	....
1–4 years	323	85	26.3	2	0.6	8	2.5
5–9 "	322	163	50.6	8	2.5	33	10.2
10–19 "	336	156	46.4	7	2.1	35	10.4
20–29 "	179	90	50.3	4	2.2	26	14.5
30–39 "	146	56	38.4	1	0.7	23	15.8
40–49 "	117	49	41.9	2	1.7	21	17.9
50–59 "	35	18	51.4	1	2.9	10	28.6
60–69 "	30	10	33.3	0	...	3	10.0
70–79 "	22	10	45.5	1	4.5	3	13.6
80–89 "	2	0	....	0	...	0	....
Unknown	102	48	47.1	2	2.0	16	15.7
Total or average	1,680	699	41.6	28	1.7	178	10.6

Table 4—Parasitological Examination of Human and Dog Feces by MIF Technics

Parasites	Villages				Fish Camps			
	Human		Canine		Human		Canine	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Specimens examined	1,261		234		419		55	
E. coli	316	25.1	8	3.5	148	35.3		
E. histolytica	18	1.4			10	2.4		
E. nana	68	5.4			43	10.3		
I. bütschlii	31	2.5	3	1.3				
D. fragilis	1	0.1			1	0.2		
G. lamblia	29	2.3	2	0.9	16	3.8	2	3.6
C. mesnili	2	0.2			3	0.7		
Total protozoa	465	36.9	13	5.7	221	52.8	2	3.6
Diphyllobothrium sp.	128	10.2	44	18.8	50	11.9	1	1.8
E. vermicularis	10	0.8			5	1.2		
Trichuris sp.			1	0.4	1	0.2		
Ascarid			13	5.5			5	9.1
Hookworm			130	55.5	1	0.2	34	61.8
Total helminths	138	10.9	188	80.3	57	13.6	40	72.7
Total parasites	603	47.8	201	85.9	278	66.3	42	76.4

infections are indicated by the numbers of Endamoeba coli and Diphyllobothrium sp. found. Endamoeba coli infections ranged between 14.3 and 41.9 per cent in the villages and between 25.6 and 47.4 per cent in the fish camps; the range of Diphyllobothrium sp. infections was between 0 and 25.6 per cent and between 2.6 and 28.9 per cent, respectively. Other protozoan and helminthic infections were quite low. Human protozoan infections were found to be appreciably higher than helminthic infections, as indicated by protozoan-helminthic ratios which averaged as follows: village, 3.4:1; fish camp, 3.9:1.

Human parasitic infection rates in villages and fish camps were 40.3 and 45.6 per cent, respectively. Rates for dogs were 66.7 and 65.5 per cent, respectively. Multiple infections were more frequent in human beings in the fish camps and in dogs in the villages. The greatest number of parasitic types per human being was four; per dog, three.

Hookworm was the most common parasitic infection in dogs, ranging from 15.4 to 100 per cent in village dogs, and from 50.0 to 92.3 per cent in fish camp dogs. According to Rausch,[10] only one ascarid (Toxascaris leonina) and one hookworm (Uncinaria stenocephala) have been identified from Eskimo dogs. Protozoan infections were few. Due to the high hookworm rates, total helminthic infections were much greater than protozoan infections, as shown by the following average ratios: village, 14.1:1; fish camp, 20.2:1.

The identification of parasites was based principally upon the characteristics of the cysts and ova found in the preserved stool specimens. Considerably fewer protozoan trophozoites were observed. No mature forms of helminths were found. Rausch[10] has found several species of Diphyllobothrium in fishes, dogs, and man in the lower Kuskokwim area; however, none has been identified as D. latum.

Bacteriological examinations were also made of rectal swab specimens taken on members of the First and Second Scout Battalions of the Alaska National Guard. These units are made up of Alaskan natives, with Eskimos predominating. Two sets of specimens were taken, one in 1955 and the other in 1957, while the units were undergoing training at Fort Richardson, Alaska. Out of a total of 1,447 specimens examined, each by direct streaking on SS agar and by selenite enrichment, only one pathogen was found, Salmonella typhosa, in a 39-year-old carrier from Point Barrow.

Discussion

Although diarrhea was reported as a year-round problem among the people sampled, the field investigator (Fournelle) was not aware of a bona fide outbreak during the period of the survey. Occurrence of the illness during this time was sporadic both within the family and among families.

Impressions obtained during personal interviews indicated that the diarrheal attacks were of a relatively mild nature. Very few liquid stools were seen and none came from individuals who were said to be having trouble at the time of the interview. The fact that diarrhea is a major health problem among these people is borne out by the physicians and itinerant public health nurses who furnish them medical care.

There is also an impression that the whole problem of diarrheal diseases is not as severe today as it was a few years ago. Jackson[11] estimated, from her talks with Eskimo mothers, a mortality rate of about 10 per cent from diarrhea among the very young in the past. There is no doubt that many fatal cases involving diarrhea are complicated

by other illnesses and there is no way of knowing how many deaths are due to a diarrheal infection as a primary cause. Although much typhoid has been reported in the past in this general area, only three persons (0.18 per cent) were found infected, with no recent evidence of illness.

A point of interest is the relatively young age of the population interviewed. The median age was estimated to be in the 10–19 age group, with 40.5 per cent under 10 years of age and 61.2 per cent under 20. Only about 5 per cent were 50 or over.

That the recent diarrheal problem among these people has been one of shigellosis is indicated by the preponderance of Shigella isolations and by the sporadic nature of the illness plus the excessive number of cases in the very young age groups.

We have no way of determining the actual number of cases and of carriers among the infected individuals. There may have been some atypical cases (active or chronic) where diarrhea was absent but where other symptoms may have been present. It would appear that shigellosis is endemic in this area as evidenced by lack of a clear-cut prior epidemic, decreasing prevalence of infection by age, and isolation of Shigella from a number of different villages and fish camps. As a result of person-to-person spread within and among families, the agents are kept in circulation within each commmunity throughout the year, thus contributing to the year-round occurrence of diarrhea.

There is some disparity evident between certain of the data which relate to the prevalence of diarrhea and its recency, as compared to the numbers of bacterial pathogens isolated. According to the interview data, the prevalence of diarrhea appears to be inordinately high in view of the relatively low numbers of pathogens found. These differences may be explained as follows: (1) Carrier status of the predominant bacterial agents isolated (shigelleae) tends to be of a relatively short duration; the shedding of organisms (which may be few in number) in feces may be intermittent; (2) examination of only a single specimen per individual may account for missed infections; (3) as may delay in submitting specimens for culturing; (4) medication; and (5) the inclusion of cases of diarrhea resulting from bacterial food poisoning (since symptoms characteristic of staphylococcus food poisoning have been noted); (6) on the basis of recent evidence,[12] certain viruses may be involved as causative agents of diarrhea; and in addition, (7) dietary factors (for example, the Eskimo people are fond of seal oil, a cathartic, as a supplement to their meals).

On the basis of the findings of this study, it is difficult to show a relationship betwen parasitic infections and the reporting of diarrhea. Of the 28 E. histolytica infections found, 18 individuals did not report diarrhea. In general, parasitism was found to be relatively light, both with respect to the number of people infected and the degree of infection per person (of the 41.6 per cent parasitized, 32.3 per cent had only one parasite). In many instances, positives were shown up by the concentration technic, while direct examinations were negative. Furthermore, the 0–9 age group, which had the highest rates of diarrhea, had the lowest rates of parasitic infections. The low prevalence of E. vermicularis compared with that observed by Hitchcock in the Bethel area [6] was no doubt due mainly to the type of specimen obtained.

In addition to the parasites listed, there were several ova-like objects which could not be identified. One of these, found in human and canine feces in several villages, resembled a large Diphyllobothrium ovum. It did not pre-

serve well. Also noted, though less frequently, were two small operculated objects. A small number of unidentified larvae was also observed.

We have found the MIF technic of stool preservation well suited where examinations must be delayed. Some of the 1,405 specimens sent to the States had been held as long as seven months before examination. We have noted that there are some ova which do not preserve well if held too long.

In recent years attempts have been made to correlate certain laboratory findings (bacteriological and parasitological) with environmental sanitary conditions. In general, conditions observed from one Eskimo village to another during this study did not vary to any great extent, except possibly in the degree of personal and household cleanliness. Within all villages, houses are small and there is overcrowding; sources of water are nearby ponds or sloughs, or rainwater if rainfall is abundant; human feces and urine, and kitchen wastes, are most often deposited in the tall grass or in the snow just outside the house; the common principal food item is fish, which may be consumed raw, partly cooked, or dried and smoked. There was no apparent correlation between either diarrhea frequencies or bacterial and parasitic infection rates and the status of village sanitation.

Although Eskimo dogs are known to be carriers of Salmonella typhimurium,[2, 18] none of these organisms was found. Since only one pathogen was isolated from dogs, the latter did not appear to be an important source of human infection at the time of this study.

The results of this survey give some information on the past history of the individual concerning the enteric diseases to which he has been exposed. It has been shown that there are a number of infected individuals who may serve as potential sources of infection to others. The Eskimo has been found to be subject to the same enteric ills as the white man with whom he is coming into more frequent contact.

Summary

The diarrheal problem existing at the time and in the area of this survey is believed to have been due primarily to two types of Shigella flexneri, 2a and 3. A history of diarrhea was given by 33.7 per cent of the people interviewed, with the greatest reported prevalence occurring during July and August. Those most extensively affected were children in the 0–9 age group, who accounted for 67.2 per cent of the cases of diarrhea and 71.9 per cent of the bacterial pathogens isolated. Except for three isolations of Salmonella typhosa, no other salmonelleae were found. Two pathogenic Escherichia coli types were isolated from four young children, 055:B5 and 0111:B4. Only one bacterial pathogen was isolated from 278 fecal specimens of dogs.

Of the human parasitic infections, Endamoeba coli and Diphyllobothrium sp. were most numerous. Prevalence rates for E. histolytica and Diphyllobothrium sp. were 1.7 and 10.6 per cent, respectively. In dogs, the most numerous parasites were Diphyllobothrium sp. (15.6 per cent) and hookworm (56.7 per cent).

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A straight thinker can write clearly if he works at it. Only a few write easily, and even they can improve their art with conscious practice. But the literature of a maturing profession will be too meager a mark of its growth if we depend only upon the few with a natural inclination to write. The rest of us must push ourselves toward that culmination of successful action—communicating it to others who may test, modify, and use our experience. Too often we stop short.

(Excerpted from The Journal of Nursing, October, 1958, p. 1421, "Accent on Leadership" by Lucile Petry Leone.)

The field of chemical additives to food is a vast one. The problems consequently are complex and have great significance for public health. This review discusses some of the challenging questions and what is being done to answer them.

CHEMICALS AND ANTIBIOTICS IN FOOD

Robert S. Roe

MUCH HAS BEEN written and said in recent years concerning the problem of chemical additives with respect to the food supply. What are chemical additives? What is the problem? Do not our federal and state food laws safeguard the food supply from poisonous or harmful chemicals?

The rapid and substantial advances in science and technology during recent decades have resulted in the production of new organic compounds, new drugs, new processes in manufacture, and new packaging. For instance, it has been estimated that over 50 per cent—some authoritative estimates say 90 per cent—of the drugs prescribed by doctors today were not known 15 years ago. Fifteen years ago lead arsenate was still the principal insecticide used for the control of codling moth infestations in the apple and pear orchards of the country. Today the spray schedules for these and other food crops provide for a host of new organics developed within the past 15 years.

Fifteen years ago a limited number of frozen fruits and vegetables in consumer-size packages were beginning to become available on the market. Today not only all common fruits and vegetables but a long list of manufactured products —from juice concentrates and beverage bases to breaded ready-to-serve shrimp and even complete "TV Dinners"—are available in the frozen foods sections of the supermarkets. And today experiments are under way to explore the utility of radioactive energy in the processing and preservation of food.

Chemicals may be added inadvertently to food as residues from pesticide applications or from sanitizing treatments of plant equipment, or they may be deliberately added for some real or fancied improvement. There seems to be no limit to the growing list of chemicals that may find their way into the food supply as stabilizers, preservatives, antioxidants, tenderizers, emulsifiers, sweeteners, colors, flavorings, or as residues of fungicides, insecticides, defoliants, herbicides, or growth promoters.

The Pesticide Amendment to the Food, Drug, and Cosmetic Act provides a procedure for establishing safe tolerances for residues of pesticide chemicals in raw agricultural products. Our three years' experience in the administration of this law has revealed many difficult problems but the law has been workable

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Since this paper was given, the Food, Drug, and Cosmetic Act has been amended by Public Law 85-929, the "Food Additives Amendment of 1958," which was passed just before adjournment by the 85th Congress and signed by the President on September 6, 1958. The amendment requires pretesting of additives to establish their safety.

and has resulted in the establishment of several hundred tolerances on various products.

Coal-tar colors represent another class of chemical additives for which special provisions are contained in the law. The statute provides for the listing of coal-tar colors that are harmless and suitable for use in food and for the certification of batches of such colors. Following the enactment of the 1938 law, 18 colors were listed as harmless and suitable for use in food. These are known as the FD&C colors. Since then, by application of the newer technics in pharmacology, together with the more complete information now available as to the chemistry of some of these dyes, it has been found that some of the colors are not harmless, as formerly believed. Last year three of the colors were delisted, and four others are the subject of delisting proceedings now under way. A bill recently was introduced in Congress proposing to amend the law to relax this "harmlessness" rule and replace it with an authorization to establish safe tolerances for coal-tar colors. This is based on the idea that the absolute safety or harmlessness rule is impractical and that safety of an additive must be related to the quantity used.

Aside from pesticides and coal-tar colors, which are particular types of chemical additives, the Food, Drug, and Cosmetic Act prohibits the addition to food of any poisonous or deleterious substance unless the addition is required in the production of the food or cannot be avoided in good manufacturing practice. If it is necessary or unavoidable, then safe tolerances may be established. Does not this provision of the law adequately take care of the problem of chemical additives? No, it does not, for two reasons:

First, the status of many substances as to their poisonous or deleterious proclivities may not be known. This is the principal problem associated with chemical additives. Little is known about the toxicology of many of the new compounds that in recent years have been proposed for uses which might result in residues in food. To prevent such uses the government must be in position to show affirmatively that the chemical additives in question are poisonous.

Second, under the law no additive is permitted unless it is necessary. Even though not necessary in the production of a food, some additives may be desirable to improve nutritive values, preserve color or flavor, or in some other way to serve purposes useful to the consumer.

There seems to be general agreement that there is need for amendment of the law to require the establishment of safety before an additive may be used. This need for new legislation was brought to public attention in 1950, 1951, and 1952 by the House Select Committee to Investigate the Use of Chemicals in Foods and Cosmetics, the Delaney Committee. As a result of its inquiries, the committee concluded that chemicals had been used in or on the food supply without adequate testing of their possible long-range injurious effects and that the public is entitled to greater protection than existing law now affords.

During the past session of Congress a number of bills dealing with this problem were introduced. Hearings were started by the Interstate and Foreign Commerce Committee and probably will be resumed when Congress reconvenes in January. One of the bills introduced was prepared by the Department of Health, Education, and Welfare. It reflects the views of the Department on the principles which should govern the addition of chemical additives to food. These may be summarized as follows:

1. The intended use should be shown to be safe for long-term as well as short-term consumption before an additive is tolerated.
2. The use of a poisonous or deleterious ad-

ditive should serve a purpose beneficial to the consumer. Purposeless additions of poisons to food should not be permitted.

3. Evidence to establish safety and beneficial purpose should be secured by the person who wishes to promote use of the additive and should be submitted to the government for evaluation by competent scientists.

4. There should be provision for appeal of an adverse decision by the government to the courts by procedures that permit full consideration of complex scientific questions by scientists.

5. Any additive already in use and the safety of which is not generally recognized should be tested to establish its safety.

It is of interest to note that the Food Protection Committee, Food and Nutrition Board of the National Research Council, published in 1954 a document titled "Principles and Procedures for Evaluating the Safety of Intentional Chemical Additives in Food." The first general principle set forth in that document reads: "A decision to use an intentional additive in foods should be based on the assurance (a) that it will be safe; and (b) that it benefits the consumer."

A word about antibotics, a class of important new drugs that have appeared during the past 15 years. Not only have antibiotics been useful in treatment or control of various infections in human beings, but they also have proved useful in treatment of other animals. Misuses of antibiotic preparations may result in the addition of residual antibiotics to food products derived from treated animals. This has been observed in the case of milk taken from cows treated for mastitis with penicillin. Results of our surveys of milk with respect to antibiotic contamination were reported by Dr. Welch of our Division of Antibiotics at one of the sections at the annual convention of this Association last year. Penicillin, even in very small amounts, may cause serious reactions in individuals who are sensitive to that drug. Hence, its presence in milk not only is undesirable but might pose a significant public health problem. A program which includes some changes in the antibiotic regulations relative to certification of preparations for the treatment of mastitis has been instituted to correct this situation.

Antibiotics, estrogenic hormones, arsenicals, and a considerable number of other chemicals have been found useful in the promotion of growth or in fattening when added to feeds for stock or poultry. Herein we have another phase of the chemical additives problem. Where certifiable antibiotics are concerned, such as penicillin in preparations for the treatment of mastitis, we can effect control under the certification procedure. In the case of other drugs, we have held that when used as growth-promoting or fattening agents they are new drugs. Under the Food, Drug, and Cosmetic Act a drug is defined, among other things, as a product intended "to affect the structure or any function of the body of man or other animals" and under the law a new drug cannot be distributed unless it is the subject of an effective new-drug application submitted by the promoter with adequate evidence of the safety of the drug. We have held that the evidence of safety in the case of drugs intended for animal use must include a showing that residues are absent from the food products derived from the treated animals. This has been the subject of a published policy statement which appears as section 3.7 in the Code of Federal Regulations.

Reports in scientific and trade journals indicate that much work has been done to investigate the utility of antibiotics as preservatives in meat and poultry products, fish, and other foods. When employed as preservatives on raw agricultural products, antibiotics come within the category of pesticide chemicals. We have had occasion to consider several petitions proposing tolerances for antibiotics in a number of raw agricultural products. Tolerances have been

established for residues of chlortetracycline and oxytetracycline at 7 ppm in or on raw poultry. This was done because the evidence before us showed that no significant residues remain when poultry bearing the tolerance level of antibiotic is cooked. In general, we do not think that antibiotics have any place in food as consumed.

The field of chemical additives is vast. The problems are complex and of great public health significance. The questions as to safety usually do not concern acute toxicity—the safety questions concern the more subtle and difficult to appraise chronic toxicity. What is the effect of regularly consuming a quantity of this or that chemical over a period of years? What are the possibilities that relatively innocuous additives may adversely affect the nutritive values of foods to which they are added? Or, what are the possibilities that mixtures of safe levels of additives may exhibit a potentiating effect on toxicity? (Such an effect has been observed in the case of two fairly common organic phosphate pesticides.) What is an adequate test procedure to detect and measure the chronic effect of the ingestion of additive residues by human beings? These are some of the challenging questions that confront those of us who are responsible for the administration of food and drug laws in the protection of the public health.

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Improvement of the environment for better health is not just a matter of technology. It may impinge on various beliefs and customs of people and lead them to reject such action. This basic principle is emphasized in this article.

THE ROLE OF BELIEFS AND CUSTOMS IN SANITATION PROGRAMS

Benjamin D. Paul, Ph.D.

MAN IS A BIOLOGICAL and social animal; he is also a cultural animal. He is cultural in that he runs his life and regulates his society not by blind instincts or detached reason alone, but rather by a set of ideas and skills transmitted socially from one generation to the next and held in common by the members of his particular social group. Culture is a blueprint for social living. Man resides in a double environment—an outer layer of climate, terrain and resources, and an inner layer of culture that mediates between man and the world around him. By applying knowledge which comes to him as part of his cultural heritage, man transforms his physical environment to enhance his comfort and improve his health. He also interprets his environment, assigning significance and value to its various features in accordance with the dictates of his particular culture. Among other things, culture acts as a selective device for perceiving and understanding the outer world. Since cultures vary from group to group, interpretations of the physical environment vary correspondingly.

Ordinarily people are unaware that culture influences their thoughts and acts. They assume their way is *the* way or the "natural" way. Interacting with others in their own society who share their cultural assumptions, they can ignore culture as a determinant of behavior; as a common denominator, it seems to cancel out. An engineer can construct health facilities in his home area without worrying too much about the cultural characteristics of the people who will use the facilities. Sharing their habits and beliefs, he has in effect taken them into account. But in another country with another culture, his assumptions and those of the residents may not match so well. In parts of Latin America maternity patients of moderate means expect a private hospital room with an adjoining alcove to accommodate a servant or kinswoman who comes along to attend the patient around the clock. In parts of rural India the hospital should be built with a series of separate cooking stalls where the patient's family can prepare the meals, in view of cultural prohibitions against the handling of food by members of other castes. And of course the effect of cultural differences looms even larger where sanitation has to be built directly into the habit systems of people, rather than into structures and plants that serve the people.

Anyone familiar with the operation of technical assistance programs knows about the kind of behavioral differences I have mentioned. Unfortunately, how-

ever, it is easy to misconstrue these observed differences. Three kinds of misinterpretation are common. The first is to suppose that "they" have more odd beliefs and habits, while we have less of them. We tend to see them as captives of blind custom and ourselves as relatively free from cultural peculiarities. The fact is that all men are creatures of their culture with its inevitable admixture of rational and nonrational elements. Cultures differ and rates of cultural change differ, but peoples do not differ appreciably in the degree to which their actions are influenced by their respective cultures. We are quick to apply the term "superstition" or the epithet "uncouth custom" to the other fellow's manner of thinking or behaving. We may be repelled by the custom of eating domesticated dogs and yet impatient with people who would rather go hungry than eat their cattle. Americans take offense at the odor of night soil in the settlements of Korea and other parts of eastern Asia; a Korean gentleman on his first visit to New York was asked by a friend how he liked the great city, whereupon he replied: "Oh, very well, but the smells are so bad!" [1] Measured by the standards of one culture the manifestations of another are bound to appear more or less arbitrary or bizarre. We need to realize that we have culture, too, and that our ways can seem as peculiar to others as theirs do to us.

Even allowing that our behavior as well as their bears the stamp of cultural conditioning, a second facile assumption is that our ways and ideas are more advanced than theirs, that they have yet to catch up with us. The trouble with this assumption is that it represents a partial truth: Some aspects of culture, notably scientific knowledge and technical skills, are indeed subject to measurement and relative ranking. But knowledge is not wisdom, and many aspects of culture, including language, esthetics, moral codes, and religious values, lie beyond objective rating for want of a culture-free standard of measurement. It is a mistake and an insult to imply, as we inadvertantly do at times, that because some areas of the world are technically underdeveloped their people or their cultures are in general underdeveloped.

A third and particularly common shortcoming in our understanding of cultural differences is a tendency to view customs and beliefs as isolated elements rather than as parts of a system or pattern. The linkages between the parts of culture may be loose or tight and the connections are not always apparent upon first inspection, but it frequently turns out that people cling to a particular practice or belief not merely because it is familiar and traditional but because it is linked to other elements of the culture. Conversely, a change effected in one area of the culture may bring with it unexpected changes in other areas or may result in awkward dislocations, as the following illustration will indicate.

On the island of Palau in the western Pacific the pattern of living calls for frequent and large gatherings of people to celebrate or solemnize certain social events. In the old days, Palauan houses were large enough to hold many people. There were no partitions, and it was possible for each man attending a feast to receive his food in the order of rank and to sit in such a way as not to cause offense by turning his back on anyone. Since the last war, most Palauans live in small two- or three-room houses built in the Japanese or American style. They try to maintain the old customs but they have their troubles. Visitors overcrowd the small house and sit packed together on the floor. They must suffer the insult of having to look at a neighbor's back and must take their food in any order they can. The Palauans are incessant betel chewers—and spitters. The old houses had several doors and numerous floor cracks to accommodate this habit. The new buildings, especially the Quon-

set huts now being created for chiefs' dwellings and council chambers, have caused a minor crisis. The two Quonset doors are premium locations; knotholes in the plywood floors are too scarce to provide relief for the majority of chewers. Tin cans are coming in as spittoons, but these are in scarce supply.[2]

Housing customs and hospitality customs, once closely linked in Palau, are now in strained relationship. It should be stated parenthetically that social or cultural strains are not necessarily good or bad in themselves; depending on the case, they can lead to increased cultural disorganization or to an eventual reorganization of the sociocultural system on a new basis.

In some instances people strive to prevent cultural strain by resisting environmental and sanitary improvements. In rural India, fecal contamination of food and water by direct contact or contact through flies and rodents constitutes a difficult problem. The source of the trouble is the custom of defecating in the open fields. Use of latrines would go far toward solving the problem. Public health engineers and others working in India have devised special types of latrine adapted to the local squatting posture and designed to meet varied soil, climatic, and water supply conditions. Numerous latrines have in fact been installed, but follow-up studies reveal that only a small proportion are used regularly. Women in particular tend to avoid the latrines. Every morning and afternoon women go in groups to the field, not only to relieve themselves but also to take time off from busy domestic routines, to gossip and exchange advice about husbands and mothers-in-law, and to bathe with water from tanks located in the field. The linked habits of going to the fields for social gatherings and for toilet and bathing activities meet a strongly felt need for community living and relaxation from daily toil. In the women's view, defecation customs are usefully linked to other customs. In the view of sanitation specialists these customs are harmfully linked to a cycle of contamination and intestinal disease. To disrupt the contamination cycle the women are urged to use the new latrines. They shy away from following this advice, partly because doing so would disrupt an ensemble of customs they prefer to keep intact, and partly because their culture has given them little basis for comprehending the connection between feces and enteric diseases.[3]

I began by saying that culture mediates between man and his material environment. In an article analyzing the outcome of a rural sanitation program in a small Peruvian town, the author explains how perceptions of so common an environmental element as water are culturally screened:

> A trained health worker can perceive "contamination" in water because his perceptions are linked to certain scientific understandings which permit him to view water in a specially conditioned way. The Peruvian townsman also views water in a specially conditioned way. Between him and the water he observes, his culture "filters out" bacteria and "filters in" cold, hot or other qualities that are as meaningful to him as they are meaningless to the outsider. [1]

An important part of the local culture is a complex system of hot and cold distinctions. Many things in nature, including foods, liquids, medicines, body states, and illnesses are classified as essentially "hot" or "cold" or something in between, irrespective of actual temperature. Sick people should avoid foods that are very cold, such as pork. "Raw" water is cold and fit for well persons; "cooked" water is hot and fit for the sick. The times of day when water can be boiled are hedged in by limitations of time and fuel and further restricted by "hot" and "cold" considerations. Water is consumed mainly around noon. Water boiled later in the day and standing overnight becomes dangerously "cold" and

must be reboiled in the morning. So it is useless to boil it at any time other than the morning in the first place. The patient efforts of a local hygiene worker to persuade housewives to decontaminate their drinking water by boiling it met with only limited success in the face of of these cultural convictions.[4]

It is interesting to note that the hot-cold idea system now widely current in Latin America apparently goes back many centuries to the humoral theory of disease expounded by Hippocrates and Galen and transmitted by Arabs to Spain and by Spaniards to the New World, where it retained a place in formal medical teaching until the 18th century.[5] Folk theories of medicine in contemporary rural India and in other parts of Asia indicate that the humoral theory spread in that direction, too, if indeed it did not have its origin somewhere in Asia. In the course of its travels the humoral theory underwent modification, so that its present form in Asia is not identical to the one in Latin America. It is remarkable that cultural complexes such as the hot-cold idea system should persist, however altered, through such long periods of time.

Objectively viewed, the cosmos and all its contents are morally neutral; nothing is good or bad in itself; it simply is. But man clothes his cosmos in a moral cloak. He evaluates it, holding some things to be good and others evil. Values, the fundamental bases for choosing between alternative courses of action, are a central part of any group's culture. Values differ, but these differences are less apparent than differences in language, dress, posture, rules of etiquette, or other overt features of the culture. Because values usually remain below the level of awareness, we are particularly apt to impose our own values upon others on the innocent assumption that we are merely helping them achieve better health. Members of our own middle class tend to make a virtue of tidiness, apart from its possible bearing on sanitation. Cleanliness is both a health measure and a cultural value. This distinction can be appreciated if we glance back through history to see the shifting value assigned to bathing and cleanliness from the time of the ancient Greeks. Such a review also illustrates the connectedness of the parts of culture.*

Although they built no great baths, the Greeks valued athletic sports and despised the Persians for their false modesty in keeping the body covered. The Romans, taking over much of the Greek cult of the body, constructed enormous public baths where men of leisure spent hours daily. The early Christians set themselves against the established pagan religion and also against many of the attitudes and amenities inherent in Roman culture. Baths were construed as instruments of paganism and vice, as devices for softening the body rather than saving the soul. Before long, even minimum cleanliness by current standards was seen as the road to ruin. The ascetic saint was indifferent to filth; attention to personal cleanliness, especially on the part of a man, incurred the suspicion that one might not be too good a Christian.

Bathing occupied an important place, however, in the lives of Europeans during medieval times. As the vessel of the soul, the body needed to be preserved. The monastery of the early Middle Ages had its bathroom for friars and pilgrims. By the 13th century, public bathhouses had come into use in the cities, providing both steam and water baths along with haircuts and minor surgery. But the presence of food and drink, girls and music increasingly converted the bathhouses into places of amusement and

* The following résumé is based on these sources: A. L. Kroeber, Anthropology, Harcourt, Brace, 1948, pp. 600–602; H. E. Sigerist, Medicine and Human Welfare, Yale University Press, 1941, pp. 69–72; A. G. Varron, Medieval Hygiene, Ciba Symposia, Vol. 1, 1939–1940, pp. 213–214.

eventually earned the opposition of the clergy. Moreover, the bathhouses became centers of infection when syphilis began to plague Europe at the end of the 15th century. Municipal bathing disappeared from the urban scene, private houses lacked baths, and the entire custom of bathing was condemned for reasons of morality and health.

Interest in bodily cleanliness was revived in the 18th century with the growth of enlightenment, the increase in comforts, the refinement of social manners, and the rise of the bourgeoisie. The lead in this direction was taken in countries where the new wealthy middle class became especially influential; hence the scrubbing of Dutch doorsteps and the proverbial Englishman with his portable bath. Today, in the United States, prosperity, democracy, and frequency of bathing have become linked values. Americans say that cleanliness is next to godliness, an indication that bathing and cleanliness are affect-laden values in contemporary middle-class culture as well as a means to better health. Yet even in the United States bathing is neither as old nor as general as people now assume. Ackerknecht reminds us that President Fillmore was as much attacked for buying a bathtub for the White House in 1851 as was Harry Truman in our time for his balcony.[6]

We might have more success in exporting our technical means for improving the world's health if we could manage to divest these means of the values and other cultural trappings that accompany their use in the American scene. It might then be easier to fit our technical means into foreign cultural contexts. To do this we need to become skilled in perceiving our own cultural contours and those of the country we strive to help. This is one of the reasons why instruction in cultural anthropology and other social sciences is rapidly being introduced into schools of public health.

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As the hospital becomes to an increasing degree a community health center, there is a growing awareness of its potentialities for health education. The experience of the Lankenau Hospital's health education program will therefore be of interest to all concerned with the expanding horizons of health service.

LANKENAU HOSPITAL'S COMMUNITY HEALTH EDUCATION PROGRAM

Katheryn E. Langwill, Ph.D., and Edward Hoge Vick, M.D.

THE MODERN community hospital has a duty beyond being a medical center. While the first goal remains the best possible medical care of the patient, it must consider tomorrow's health through an ever-expanding research program. Beyond these accepted functions lies the field of health education.

Sigerist in 1946 stated it well: "And so we are beginning to see the place that the physician is holding in modern society. We see him as a scientist, educator, and social worker ready to cooperate in teamwork, in close touch with the people he disinterestedly serves, a friend and leader who directs all his efforts toward the promotion of health and prevention of disease, and becomes a therapist when his previous efforts have broken down—the social physician protecting the people and guiding them to a healthier and happier life." [1] The Lankenau Hospital's Health Education Program was designed to fulfill this purpose.

Objectives of the Health Education Program

Briefly stated, these are: (1) to interpret the knowledge of medical science that people may utilize such information to become and remain healthy; (2) to emphasize the usefulness of periodic health examinations using newer diagnostic aids in detecting incipient disease; and (3) to present the findings of medical scientists in biological perspective to insure continuing support of basic research, medical education, and clinical investigation on the broadest possible base.

Methods

The methods used at the Lankenau Hospital may be listed under the following headings:

Department of Health Education

General hospital funds support this program which is directed by a full-time specialist in the field. Policy is formulated by this department head in consultation with a committee of the medical staff. The health museum and the auditorium are the chief tools of the director. The Junior League of Philadelphia considered this an important community project and therefore provided volunteers from its membership to staff the museum and assist in promoting the program.

In the auditorium there is a life-size "talking" transparent woman called Pandora, designed to teach anatomy and physiology. During her presentation, Pandora describes the function of each organ of the body as it lights in natural color.

The museum uses three-dimensional animated models and exhibits with moving mechanisms. The exhibits are arranged to tell visually the story of the human body and its functions, "The House You Live in but Once." To make our teaching methods more effective, a script has been prepared which is transmitted by short wave radio so the museum visitor using the "Guide-A-Phone" receiver will hear a description of the exhibit in front of him. The content of this lecture and all material used in the program have been carefully reviewed by our physicians.

For example, when looking at the skin exhibit this is a portion of what one will hear: "Your sense of touch, or senses of touch, since there are several, are found mainly in your skin. But they are also found in your tongue, the lining of your mouth, and the inside of your body. Your first sense of touch is pressure. Other skin sensations are pain, heat, and cold."

The basic scientific facts of human biology, of nutrition, of child, maternal, and dental health are included as well as a series of exhibits on the "Wonders of New Life."

Exhibits on Important Disease States and Therapeutic Procedures

The space available in the Health Museum is limited, but the more or less permanent exhibits are flexible enough to allow outstanding educational exhibits from outside sources to be shown from time to time. These rotating exhibits are obtained on loan from other museums, medical societies, or pharmaceutical houses.

Familiarization with the Hospital

Harrison, in discussing the human relation problems in a hospital community, has emphasized the fear many patients have in anticipating hospitalization.[2] A frank explanation of hospital procedures does much to allay such apprehension. By means of Kodachrome slides with a sound tape narrative, visitors to Lankenau are acquainted with the functioning of the various hospital departments. As one little girl said, "I don't mind having my appendix out. I know just what they do and where I'll be all the time because I've been through the Health Museum and the hospital." This is a portion of what she heard when looking at the playroom: "In the section of the hospital where the children are, there is a playroom with toys and games and even a television set so you can have a good time while you are getting better."

A six-week course for expectant parents has been given for people awaiting their first-born child. Doctors and nurses instruct potential parents in facts of human reproduction, the practical aspects of infant care—and probably more important—discuss the infant's physical and emotional development in the first few months of life. These discussions are reinforced with films on each topic. Our film library is carefully selected.[3] Health and safety topics are screened for content and controlled for viewing age and educational level to obtain maximum value from this medium. Such a film on the accident hazards of the family dwelling—"Mrs. Hazard's House"—emphasizes the physical responsibility of making the home a safe place for the new infant.

Public Forums

To familiarize the people of our community with nationally and internationally known scientists and to interpret

the facts of their research for inquiring minds nonscientifically trained, discussions of diabetes, stress, problems of the aging population and of retarded children have been presented in separate sessions about twice yearly. Organizations interested in the continuing crusades against cancer, arthritis and rheumatism, mental illness, heart disease, poliomyelitis, alcoholism, and multiple sclerosis have used the hospital's facilities. The Health Education Department has arranged for a community branch of Alcoholics Anonymous to meet at the hospital weekly.

Communications

The hospital has a closed circuit television channel with a television receiver in every room. Patients well enough to view programs emanating from the auditorium can be considered a "captive audience" for these educational or inspirational presentations.

There are two printed communications that are sent to the members of the community. These are "Lankenau" and the Health Museum Newsletter—"Museum Musings." The former is an illustrated quarterly and a potential vehicle for enlisting the broadest possible financial support. Museum Musings was initiated and edited by one of the volunteer workers. This was undertaken to inform these workers about health maintenance technics and concrete problems of providing the best possible museum assistance.

Preventive Medicine in the Medical Curriculum

The interest of the physicians heading the Departments of Preventive Medicine of the Schools of Medicine in Philadelphia has spurred those responsible for the community health program of this hospital to crystallize the experience to date for presentation and discussion before small groups of medical students. Sevringhaus in 1953 discussed the prospects of increasing concern of physicians in community health education during his address on the occasion of the opening of the new Lankenau Hospital.[4]

Practical Application to Personal Medical Care

Because thinking physicians are deeply concerned with finding ways and means of providing better medical care at a price the majority of the public can afford to pay, a "Health Examination Service" was created. This service is primarily intended to encourage "well" people to recognize the importance and value of periodic health examinations. Many abnormal physical conditions may be discovered early, thereby increasing the possibility of correction with a minimum of discomfort, expense, and loss of time from daily activities.

This plan is a minimum basic examination for well people. It includes a complete history, physical examination, blood count, urinalysis, serology, blood sugar, electrocardiogram, and chest plate. The service is provided by attending physicians of the Lankenau Hospital staff. If further tests or consultations are recommended, the referring physician and his patient are entirely free to decide where and by whom the additional tests or consultations will be done. This does not carry a complicated consultation and referring technic found in most diagnostic centers. Thus it encourages a continuation of family physician-patient relationship.

Results

The number of groups and individuals who have visited the museum and participated in the program are tabulated in Table 1. The program has been in effect since December, 1953, and the analysis by years (hospital fiscal years) indicates increasing interest in the program. "Medical Horizons," a nationally televised series, on January 23, 1956, carried the story of Lankenau under the title of

Table 1

	June 1 Through May 31		
	1954–1955	1955–1956	1956–1957
Total Number of Groups Visiting the Health Museum	201	342	504
Church Groups	24	28	31
Scout Troops	28	63	100
Schools Groups	107	140	176
Miscellaneous Groups	42	111	197
Individuals in These Groups	7,000	12,077	14,485
Individuals Viewing Slides of the Hospital	4,300	8,376	8,197
Individuals Shown Films	3,935	6,917	7,760
Individuals Hearing Pandora's Story	....	5,859 (5mos.)	10,797
Couples in Expectant Parents' Classes	155	238	334
Requests for Speakers	19	31	48

"The Changing Hospital." This was followed by a much greater demand for various aspects of our program.

Comparison of the Current Program with Other Efforts in Community Health Education

The present program was modeled after the Cleveland Health Program and Bruno Gebhard, M.D., served as consultant. The results of the Cleveland program were summarized in a recent paper.[5] Unfortunately the programs are too dissimilar for useful comparison.

Critique of the Program

At the present time these efforts do not lend themselves to a precisely controlled experimental design. The program must be considered as a "pilot plant" operation in a supplementary type of health education.

The Committee on Health Education of the medical staff is aware of the complexities inherent in the evaluation of this program. At the present time methods of assessing levels of awareness of health information are not established. One would like to know in what areas of knowledge the younger segments of our community are deficient, what are the best methods of correcting this deficit, and what technics would be available to measure the effectiveness of the educational program in these delimited areas. There appears to be a real need for specialists in the social sciences interested in general health education problems of this type. Such specialists need to intensify sociological research aimed at studying the life cycle of the human being in his social environment, and specifically here, the well-being of the individual in relation to his family and the community hospital.

Summary

The inevitable position of leadership that befalls a physician in his home community has been presented. The physician's public, not to mention the American people in general, must be educated by example and by demonstration to realize that practices advocated by the present-day physician are in keeping with his mission in life—i.e., to promote and preserve health and to provide the best medical care at the lowest possible price for the well-being of his patients. History has shown that society will dictate the kind of practitioner it will train. It will also dictate the kind of medical care it will accept and pay for willingly. When people are convinced they are receiving the full benefits of improved

medical education, they will support it.

It is our hope that the health education program may provide an opportunity for physicians of our community to be leaders in the promotion of health. A physician must be concerned with more than the care of the sick and injured, he must study health as well as disease, aid in maintaining and supervising health, advise and educate the public by providing the best health and medical care that is available.

Our experience in this effort since December, 1953, has indicated there is a need for this program and the presentations have been appreciated. Over 60,000 people have visited the Health Museum annually. Approximately 25 per cent have come in organized groups to take advantage of programs planned for specific ages and needs. Selected material from prepared tours of certain parts of the museum, Pandora's story, slide tours of the hospital and its functioning, and health and safety films provide tailored health education programs. Such variety affords our groups a better understanding of their bodies and how to care for them—health through knowledge.

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This is a report of a pilot study undertaken to determine whether it is possible to develop a psychological test capable of differentiating the person who might be involved in automobile accidents. While the results are simply indicative, the authors feel such a possibility exists.

A PILOT STUDY OF DRIVERS INCURRING AUTOMOBILE ACCIDENTS

Gerard G. Neuman, Ph.D.; James M. Howell, B.S.; and William R. E. Newman, M.D.

IN REVIEWING a number of automobile accident prevention studies, it was found that most of them concentrated on either vehicle construction, mechanical problems, road construction, traffic control, or law enforcement. Most of the studies ended with a statement that the key to the solution probably could be found in knowing more about the driver himself. Very little, however, could be found in previous research which actually attempted to study the driver.

Some who had had experience in traffic courts or clinics, dealing with traffic offenders, stated that "A man drives as he lives," explaining that driving was only one small part of the man's total life adjustment. By knowing more about the features entering into his life adjustment, one would consequently learn more about his driving habits. There were other less comprehensive statements apparently indicating statistically that the person having more accidents was generally of somewhat lower intelligence, of adolescent age, if not chronologically certainly in terms of development, and a person who had in general been less able to make an adjustment to the community. This could often be seen from his having been known to more community agencies during his earlier life than other comparable individuals.

Since none of this, however, seemed to be sufficiently specific to be measurable or to be of practical use in accident prevention, it was decided to undertake a pilot study of some individuals who had run into a number of accidents so that by comparing them with others on a number of psychological measures which might be related to the problem, one might determine whether a practical way could be found of differentiating between the more and the less accident-prone driver.

Procedure

The sample population used in this study consisted of 17 policemen (Ss) employed by the Police Department, Salt Lake City, Utah.

The non-accident subjects (NA Ss) were nine policemen who were still serving their probation period. They ranged in age from 21 to 28 years with the mean age being 23.56 years. Four Ss were married and the rest single. They were predominantly of the Latter Day

Saints religion. The NA Ss had a mean number of years of education of 12.33 with a range of from 10 to 14 years.

The accident subjects (A Ss) were eight policemen who had been on the Police Force from 2 to 20 years with the mean years of service being 10.86. Their mean age was 37.50 years and ranged from 30 to 50 years. Seven of the A Ss were married and the remaining S was separated. The A Ss were also predominantly of the Latter Day Saints religion. Their mean number of years of education was 12.75 with a range of from 12 to 16 years.

The designation of A and NA was made by the chief and assistant chief of police in Salt Lake City.

The following tests were administered to the Ss in several single group settings:

Allport-Vernon, Study of Values (Rev. Ed.)
Blacky Test
Blacky Defense Preference Index
Blacky Defense Preference Index (Revised)
California Psychological Inventory
U.S.E.S., General Aptitude Test Battery Part H (Spatial) only
Facial Expressions Test
IPAT, 16 Personality Factor Test
Level of Aspiration Test

Ten of the Ss were also given a clinical evaluation on the basis of the Rorschach, Thematic Apperception Test, and the Wechsler Adult Intelligence Scale.

The general procedure was to see if any of the various test subscales would, by use of statistical t-tests, differentiate the NA and A Ss in terms of their mean scores.

Results

The Blacky Test did not differentiate the NA and A Ss with any desired degree of proficiency. Two significant differences were obtained on "Sibling Rivalry" ($t = 2.365$, $p < 0.05$) and on "Anaclytic Love Object" ($t = 2.565$, $p < 0.05$), two of the 13 subscales of the test.

No significant differences were obtained on the subscales of the Allport-Vernon, A Study of Values; Blacky

Table 1—California Psychological Inventory Table of t-Tests

Scales	Accident		Nonaccident		t	p
	Mean	S.D.	Mean	S.D.		
Do	24.88	6.10	33.33	3.57	3.536	0.01
Co	18.75	3.54	20.78	2.33		
Sy	22.12	5.79	28.78	2.22	3.055	0.02
Sp	33.38	5.83	39.22	3.19	2.607	0.02
Sa	19.38	2.72	21.44	2.13		
Wb	34.38	6.30	38.67	3.57		
Re	26.62	6.95	31.22	4.21		
So	34.00	4.47	34.22	4.49		
Sc	26.88	7.08	29.33	7.33		
To	19.25	6.36	24.56	3.09		
Gi	14.12	7.53	21.44	6.50	2.153	0.05
Cm	26.38	1.19	26.56	1.59		
Ac	24.25	4.56	28.78	3.73	2.254	0.05
Ai	16.62	4.69	19.89	3.72		
Ie	36.12	7.14	40.89	2.52		
Py	10.50	2.33	13.33	1.41	3.076	0.01
Fx	8.00	3.30	9.89	3.43		
Pe	13.62	3.02	14.00	2.18		

Table 2—IPAT—16 Personality Factor Tests
Table of t-Tests

Factors	Accident-Prone N-8		Nonaccident-Prone N-9		t	p
	Mean	S.D.	Mean	S.D.		
A	4.00	1.85	6.22	0.83	3.127	0.02
B	4.12	2.10	4.78	2.17		
C	3.62	1.92	3.89	2.20		
E	4.88	2.03	5.56	1.74		
F	4.88	2.23	5.89	1.05		
G	4.50	2.39	4.56	1.59		
H	3.12	1.73	5.44	1.67	2.829	0.02
I	4.00	1.60	3.33	1.80		
L	4.38	1.30	4.78	1.30		
M	4.50	0.93	3.22	2.33		
N	4.88	2.23	5.67	1.94		
O	6.38	1.41	5.44	1.13		
Q_1	5.00	1.85	5.89	1.27		
Q_2	4.88	0.99	5.44	1.01		
Q_3	5.00	2.00	5.78	2.11		
Q_4	4.75	2.25	4.33	2.06		
MD	4.88	0.84	6.33	1.94		

Defense Preference Index (both the original and revised); Level of Aspiration Test; and U.S.E.S., General Aptitude Test Battery.

Table 1 shows the means and the significance of their differences for the California Psychological Inventory subscales. As can be seen in Table 1, there are six significant differences. Fifty per cent of the significances occur on measures of poise, ascendancy, and self-assurance. The remaining significant differences occur on measures of socialization, maturity, and responsibility; achievement potential and intellectual efficiency; and intellectual and interest modes. The scales on which the differences occur are Dominance, Sociability, Social Presence, Good Impression, Achievement via Conformance, and Psychological-mindedness, respectively.

Nine significant differences between NA and A Ss were obtained on the various categories of the Facial Expressions Test. In view of the fact that there are 74 categories on the Facial Expressions Test, these few significant differences do not differentiate the NA and A Ss with a sufficient degree of proficiency.

Table 2 shows the means and the significance of their differences for the subscales of the IPAT, 16 Personality Factor Test. The only significant differences are exhibited on Factors (subscales) A and H. The NA Ss had the higher mean score in both cases.

Discussion

The results as seen from Table 1 and Table 2 indicate that the NA Ss tend to be more persistent, self-reliant, and independent individuals. They are more outgoing, enterprising, competitive, and forward, and while being more attentive and observant, become more original and fluent in thought. They tend to be more good natured, ready to cooperate and attentive to people. They would be more generous in personal relationships, less afraid of criticism. The A Ss on

the other hand, would tend to be more stiff, cool, aloof, more inhibited with unexpressed feelings of inferiority, and would like things rather than people. They would tend to be more rigid in their ways of doing things and in their personal standards, and more self-centered and less concerned with the needs and wants of others. They would usually not be able to keep in contact with all that is going on around them.

The differences on the Blacky Test would tend to indicate that the NA group would have reached a more mature way of psychological development.

A word should be said about the experimental and control groups: There is a considerable difference in age and in length of service of the NA Ss as compared to the A Ss. It would be unwise to generalize beyond this sample since both groups belong to one occupational group. Also the number of accidents chosen to define the A group—two or more accidents in the year prior to the study—may have been too low to establish a valid criterion. Furthermore, the NA Ss had been employed by the police force for approximately only two months at the time of the beginning of this study. Therefore, they had very little time to run up any accident records with the police force and we did not know, at the time of the study, how many of them might. In this respect the odds are stacked against the researcher, so that the findings may be more conservative than they might be in reality.

While more intensive clinical studies allowed for interesting speculations and hypotheses, the findings are too tentative to be discussed here in any detail. It seems worthwhile, however, to continue intensive clinical studies for different groups of the population in relation to their accidents experience.

What are some of the benefits of this study? While many previous studies have concentrated on physiological functions such as vision, hearing, motor reactions, and others, and studies have attempted to deal with physical type variables such as motor vehicle construction, mechanical problems, road construction, traffic control, etc., none seem so far to have any real possibility of predicting whether a person is or is not likely to have accidents. Although this is a pilot study, it does indicate that differentiation on some test variables may become practical. It might be possible to construct a test which would consist of the discriminating items of the IPAT—16 Personality Factor Test and the California Psychological Inventory. This would require an item analysis of those tests and would cut down the over-all testing time to possibly 30 or 40 minutes. This new short test would then make it feasible to test larger samples and to employ cross validation technics to verify the results.

The findings are suggestive of avenues for further research in the direction indicated. As cross validations confirm some of the earlier results, it may be possible to move into controlled application. Should such controlled observations prove useful, plans for a more general use in the field of accident prevention could be advanced.

ACKNOWLEDGMENT—We would like to thank Chief Cleon Skousen and Assistant Chief F. Clark Sanford of the Salt Lake City Police Department, and the participating police officers for their interest and cooperation in making it possible for this pilot study to get under way. We would also like to thank the University of Utah Research Committee which provided the financial opportunity to do this study.

The authors are associated with the University of Utah, College of Medicine, Salt Lake City, Utah.

The idea that speed is all-important in producing motor vehicle deaths is subjected to analysis in this study. The result shows that speed is only one of a combination of factors, of which some may be more important in controlling highway injury and fatality.

A STUDY OF SPEED IN INJURY-PRODUCING ACCIDENTS: A PRELIMINARY REPORT

John O. Moore

AUTOMOTIVE Crash Injury Research of Cornell University is a medical and statistical group which, over the past five years, has conducted basic research into the generic aspects of automobile accidents and their resultant injuries. At present, data are collected from the national highways with the cooperation of local police, medical, and public health groups in 17 states and two cities. Analysis of the data revealed patterns of preventable injury which led to changes in automotive design. Subsequent data indicate that these have led to reduced occurrence and severity of injury in accidents. Such changes are represented by padded instrument panels and sun visors, recessed hub steering wheels, strengthened door locks, and automobile seat belts.

It is expected that a continuation of the present approach will provide a satisfactory definition of both the crash injury problem as a whole and the importance of individual segments, such as the relation of speed to injury, the relation of design to specific types of injury, and the type of medical care necessary for the injured. These segmental problems may then be subjected to further, intensive study.

This report investigates the common assumption that fatal injuries sustained during automobile accidents are associated with high speed and that if speed were rigidly controlled, fatal crash injury could be eliminated. On the one hand, there is a constant reiteration that "Speed kills . . . Slow down and live!"; while on the other hand, it is obvious that greater speed and mobility are increasingly being introduced into our culture. Thus, there appears to be an insoluble contradiction: the increase of speed and the belief that speed is a deadly menace. It is strange that such a situation should exist since the contention that "speed kills" has never been actually proved. It is the purpose of this preliminary study to examine data which may throw light on the subject of the relationship between speed and injury or death.

There is little doubt that the "high" or "excessive" speed of a traveling automobile can cause an accident; as the speed increases, so does the rate of closure, thereby reducing the time available for visual and motor responses to accomplish their objectives. The cause of injury, however, is another matter, for all accidents do not necessarily produce injury.

This paper examines accident and in-

jury data on 3,203 automobiles involved in injury-producing accidents to determine effects which speed may have had on the frequency of dangerous or fatal injuries in such accidents.

The examination consists of four substudies: (1) the frequency distributions of the cars according to "traveling" and "impact" speeds in progressive ranges of 10 mph; (2) the frequency of dangerous or fatal injury in each of the progressive "traveling" and "impact" speed ranges; (3) the extent to which rigid control of "traveling" speed would reduce the frequency of dangerous or fatal injuries in injury-producing accidents; and (4) the influence which factors other than speed (ejection, seat area occupied, site of impact) have on the incidence of dangerous or fatal injuries.

Materials and Methods

An interstate cooperative program involving police, highway patrol personnel, physicians, and public health authorities in over 17 states and two cities produces Automotive Crash Injury Research data through the use of detailed photographs and specially designed accident and injury forms. Sampling technics control the reliability and representativeness of the data. State police and highway patrolmen are specially trained by project personnel in investigative, reporting, and photographic procedures. Hospital emergency room staffs and physicians in the areas sampled are also briefed on the program and public health or similar authorities act to secure complete, detailed, and accurate medical reports. All persons participating in the program are oriented and motivated toward the requirements of a study aimed at complete fact-finding concerning accident-injury factors, as well as accurate identification of the specific and structural causes of injury.

Definition and Discussion of Terms

Realistic examination of the relationship between speed and injury or death requires a distinction between traveling * speed and impact † speed. For example, the driver of a car traveling at 60 mph may foresee an accident, apply his brakes, and finally strike an object at 40 mph. Thus a chain of events leading to the possibility of an injury is created: a particular traveling speed results in an accident involving a particular impact speed; the injury observed, although related to both the traveling and impact speeds, is more closely related to the latter, while the occurrence of the accident is related to the former. This study, therefore, while examining the relationship between speed and death or serious injury, will keep data on traveling speed distinct from that on impact speed.

One of the difficulties in dealing with speed data is that speed reporting is sometimes subjective. Objectivity in this field of study would require speed recording instrumentation in every automobile, or very large-scale employment of radar or similar devices. Since neither of these methods is used presently for research—nor promises to be in the immediate future—reliance must be placed on the accuracy of speed reporting by police and highway personnel.

These professional accident investigators have had years of experience in estimating speeds through observation of many thousands of traveling cars; they are trained in the proper methods of interpreting accident details and use such evidence as the extent of basic car damage, tire condition, skid marks, types of road surface, weather conditions, and

* Traveling speed: the speed of the car just before involvement in an accident.

† Impact speed: the speed at which the major impact occurred between the car and object(s) or other car(s) or vehicle(s).

related information in determining accident speeds. Also, recent years have seen the development of tests to measure and improve the accuracy of police and highway personnel in estimating rates of closure. Thus, although most current speed reporting is partly subjective, the subjectivity is being progressively minimized. Speed data reported to Automotive Crash Injury Research has the additional advantage of support and confirmation through photographic evidence. Experienced accident analysts at the project's headquarters in New York City use detailed pictures of car damage to corroborate reported traveling and impact speeds.

Portions of the report which follow deal with the implications that certain speeds are "excessive" or "above limits." Of course, speed limits in one area of the country often differ from those in another because of variations in terrain, road design, traffic density, and so forth. Nevertheless, an arbitrary definition of what speed is "excessive" can be based on the knowledge that large segments of our present rural highway systems actually employ a speed limit of 60 mph. Thus, for purposes of discussion, this study deals with an arbitrary speed "limit" of 60 mph and refers frequently to speeds above or below this "limit."

Observations

Basic Data for Study

Each of the 3,203 passenger automobiles studied was involved in an accident during the period from 1953 to 1956 inclusive, and contained at least one injured person. Every type of accident is represented and the total sample resembles national registrations of passenger automobiles in terms of makes, models, and years of manufacture.

The 3,203 cars carried 7,154 occupants, or 2.3 persons per car. Among the 7,154 occupants various degrees of injury were sustained in the following proportions:

	Per cent
No injury	25
Minor injury (bruises minor lacerations, etc.)	46
Nondangerous injury (severe lacerations, fracture, etc.)	20
Dangerous injury (internal, brain injuries, etc.)	5
Fatal injury (death intanstaneous or within 24 hours after accident)	4

Reported Traveling Speeds and Impact Speeds of Automobiles in Injury-Producing Accidents

Figure 1 shows the distribution of the 3,203 cars according to both reported traveling and impact speed. It will be seen immediately that the greatest proportion of these cars were traveling at speeds in the 50–59 mph range and impacted in the range of 40–49 mph. Calculation shows that the average traveling speed was 50 mph and the average impact speed 42 mph.

The basic regularity of the distribution curves in Figure 1 establishes an important fact: the majority of injury-producing accidents studied were not associated with the higher speed ranges as popular opinion would have led us to expect. Cars in injury-producing accidents appeared in all ranges of speed and arranged themselves in the typical bell-shaped distribution curve.

In Figure 2 the speed data are presented in cumulative fashion, showing that 16 per cent of the cars traveled at 29 mph or less, 29.5 per cent traveled at 39 mph or less, 48.3 per cent traveled at 49 mph or less, etc. Combining data on the cars which traveled at the most "common" speed (50–59 mph, as shown in Figure 1) with data on the cars which traveled at lesser speeds, we find that a total of 74.1 per cent of the 3,203 cars studied had been moving at speeds under 60 mph before becoming involved in injury-producing accidents.

Similar consideration of impact speed

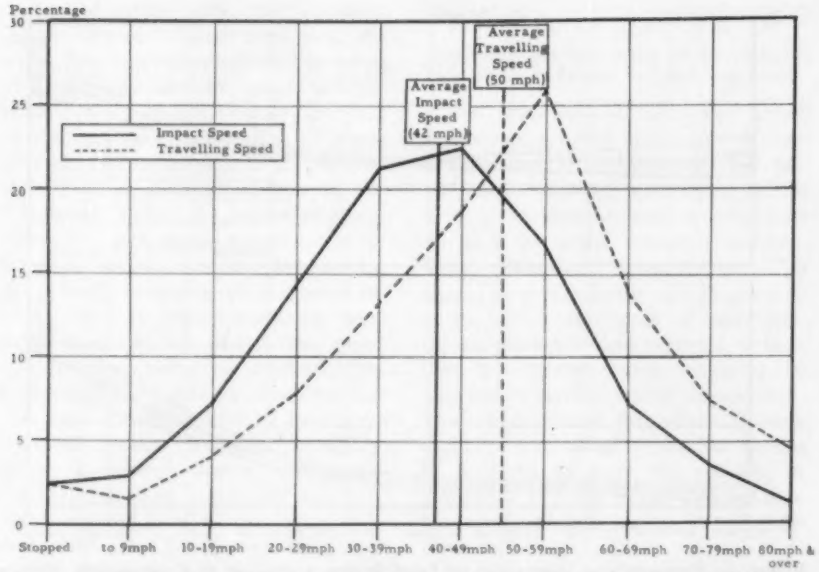

Figure 1—Distribution of Reported Traveling and Impact Speeds Among 3,203 Cars in Injury-Producing Accidents

as opposed to traveling speed tells much the same story. The bulk of the cars impacted in the lower speed ranges. The cars which impacted at the most "common" impact speed (40–49 mph, as shown in Figure 1), combined with all the cars impacting at lower speeds, comprise a total of 70.9 per cent of the 3,203 cars.

Occurrence of Danagerous or Fatal Injuries as Related to Speed in Injury-Producing Accidents

Figure 3 shows what proportion of the persons traveling or impacting at

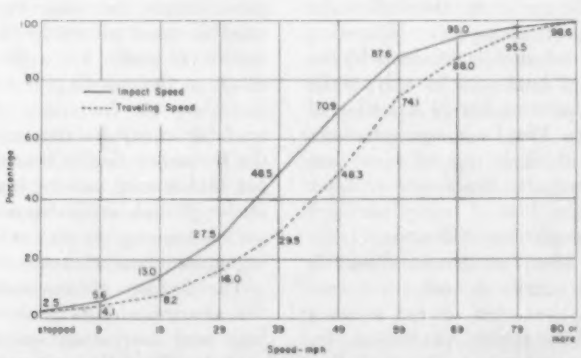

Figure 2—Percentage of Cars Traveling or Impacting at or Below a Specified Speed

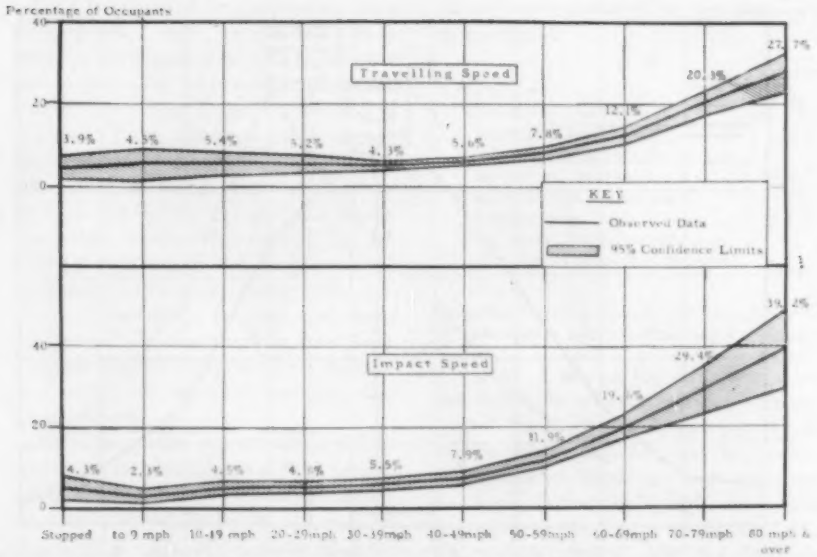

Figure 3—Frequency of Dangerous or Fatal Injury According to Progressively Higher Ranges of Traveling and Impact Speeds

successive speed ranges suffered dangerous or fatal injury. (Such injuries were sustained by 9 per cent of the total occupants in the cars studied.) These two grades of injury (representing trauma which placed car occupants either on hospital "critical" lists or in morgues within 24 hours) are used in this study to measure the effect of speed in automobile accidents; they reflect the severest aspect of injury. Measuring the effect of automobile accidents by the occurrence of fatal injuries only, while dramatic, illustrates merely a portion of the problem. That large segment of the population which is injured to a dangerous degree also represents a major problem. The loss of manpower and dollars through hospitalization, treatment, and often permanent disability has become a critical matter not only to industry, but also to the military services and the medical profession. Injuries of lesser degree—often including those of a painful, disfiguring, or disabling nature—are, of course, also important and will be dealt with in a subsequent study.

Analysis of data on injury-producing accidents shows that as traveling and impact speeds increased there was a steady and statistically significant increase in the frequency of dangerous or fatal injury. However, as Figure 3 indicates, injury increases were relatively small in speed ranges up to and including 40–49 mph. From the 50–59 mph range, as the traveling or impact speeds increased, the frequency of dangerous or fatal injury became more marked; the frequency finally rose to nearly 28 per cent among persons traveling at or above 80 mph and to approximately 40 per cent among persons in cars impacting at or above this speed.

The finding of association between the occurrence of dangerous or fatal injury and increasing speeds must be viewed with caution. Association of injury with speed does not preclude asso-

ciation of injury with other accident-injury factors. Aside from this, the speed data must be interpreted in terms of how many cars or people are involved. For example, only 4½ per cent of the cars were traveling at or above 80 mph, and no more than 25 per cent were traveling at or above 60 mph.

Keeping in mind the important observation that high speeds are relatively infrequent, we can proceed to examine the differences in risk of dangerous or fatal injury in injury-producing accidents according to whether the speed was above or below an arbitrarily selected limit. In this examination, the observations are restricted to the traveling speeds because these are more readily subject to control than impact speeds.

Since the most commonly reported traveling speed in injury-producing accidents was in the 50–59 mph range, we arbitrarily use 60 mph as our dividing line and can proceed to observe the frequency of dangerous or fatal injury among persons who were in accidents while traveling above or below this speed.

Tabulations showed that about 6 per cent of the occupants of cars involved in accidents while traveling at speeds up to 60 mph sustained such injuries; above this speed the toll was in the order of 17 per cent. Thus, it might be said generally that in the injury-producing accidents studied traveling above 60 mph was associated with a nearly three-fold increased risk of dangerous or fatal injury.

The findings at this point must, once again, be treated with reservation. What has been discussed has been risk if involved in an accident without regard to frequency. Further, there exists a distinct possibility that factors other than (or concomitant with) speed acted to create dangerous or fatal injury. Simultaneous consideration of risk and frequency can be accomplished by means of "expectancies."

Discussion

Occurrence and Expectancy of Dangerous or Fatal Injury as Related to Speed Regulation

For purposes of discussing speed regulation, a speed of 60 mph is used here, too, as the dividing point for comparison. Although authorities in the field of accident prevention emphasize the need for public education concerning the hazards of "excessive speed," it should be repeated that only 25 per cent of the cars in this study of injury-producing accidents were reported to have been traveling at speeds exceeding 60 mph before involvement in the accidents. Thus, it is evident that efforts devoted exclusively to speed regulation cannot be expected to solve the problem of dangerous or fatal injuries in automobile accidents with any degree of completeness.

Since even a small reduction in the frequency and severity of injury is immediately desirable and since the data presented show an association between speed and injury, some improvement in the injury picture can be achieved through speed regulation. Nevertheless, it should be recognized that speed is but a single factor associated with injury in accidents and that other factors may be even more significantly associated. Although the risk of a dangerous or fatal injury in the injury-producing accidents studied increased markedly at the "top" speeds, both the risk and frequency of distribution of dangerous and fatal injuries must be taken into account in answering the vital question: "To what extent can rigid control of traveling speed reduce the current toll on the highway?"

To answer this question the method of "expected values" was used. In essence, the purpose of this method was to secure a gross estimate of what would have happened had rigid speed controls been enforced during the time when these data were collected. The pro-

cedure entailed certain assumptions: (1) every vehicle traveling above the specified "rigid speed limit" would, instead, have been traveling at that speed; (2) the risks for the individuals "moved down" by this rigid speed limit would have been the same as the risks of the individuals actually traveling at this limit in the study; (3) other factors would not have changed. For example, the reduction in speed would not have changed anything about the accident and there would have been the same number of people, cars, types of accidents, and so forth. Under these assumptions, it was possible to gain a gross estimate of the dangerous or fatal injuries which presumably would have occurred if the speed in these injury-producing accidents had been rigidly controlled to a specified limit.

The expected percentages (Figure 4) show that if the speed limit had been rigidly fixed at 79 mph (by some miraculous 100 per cent control), then 96 per cent of the dangerous or fatal injuries would still have occurred. If the limit had been restricted to 69 mph, then 85 per cent of the injuries would nevertheless have occurred. Similarly, a top limit of 59 mph would have yielded 73 per cent. Even if the rigid speed limit had been reduced and held to 49 mph, there would have resulted an essentially limited reduction in the number of dangerous or fatal injuries, for 60 per cent of the dangerous or fatal injuries would still have occurred. Hence, while rigid speed control of the top speeds would be expected to produce some improvement in the injury picture, there seems to be a definite limit to the amount of improvement that can be achieved by absolute speed regulation.

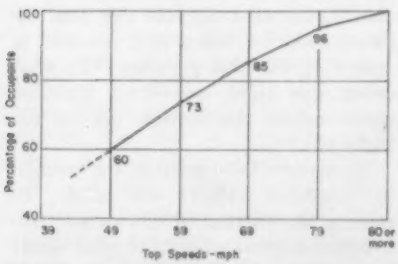

Figure 4—Expected Percentage of Dangerous or Fatal Injury at Specified Top Speeds

Other Factors Influencing Injury

It has been indicated that speed is not the sole element in producing dangerous or fatal injuries. Certainly there are accidents of such unusual and extreme circumstances that no efforts—reduced speed or any type of designed safety engineering, such as seat belts, harness, padding, and others—can avail in avoiding serious injury or death. Collisions with immovable barriers often represent this type of accident—which fortunately accounts for a relatively small proportion of the injury-producing accident situations observed. Further, analysis by the "expectancy" method has indicated that speed control offers only partial solution to the problem of these injuries. Granting that there is no injury if there is no accident and that "excessive" speed may have a bearing on whether or not an automobile accident occurs, speed control nonetheless would seem to imply accident prevention more than injury prevention.

Previous studies have revealed several accident factors (other than speed) associated with the occurrence and seriousness of injury in automobile accidents; three of these factors will be discussed briefly here. One is the phenomenon of ejection, which takes place most frequently when doors open under impact conditions. The consequence of doors opening—it has been established that front doors open in about 50 per cent of cars in injury-producing accidents—is that ejection occurs among approximately 13 per cent of the total car occupants. The profound effects of ejection on injury are shown in Table 1. Dan-

Table 1—Risk of Injury as Related to Ejection or Nonejection

	Percentage of Occupants with			
	Moderate Through Fatal Injury	Severe Through Fatal Injury	Danger-ous or Fatal Injury	Fatal Injury
Nonejectees	23.9	9.9	5.5	2.6
Ejectees	49.9	36.4	26.6	13.3
Injury ratio, ejectees to nonejectees	2.1:1	3.7:1	4.8:1	5.1:1

gerous or fatal injuries were sustained by five times as many ejectees as nonejectees, i.e., ejection multiplied the risk of dangerous or fatal injury by five.

Another factor bearing upon the production of dangerous or fatal injuries relates to the specific areas of the car occupied by passengers. Table 2 shows the frequency of dangerous or fatal injury among occupants of various seat areas.

Although the problem of injury as a function of the seat area occupied is a subject for further and more thorough study, the table clearly shows that the likelihood of receiving a dangerous or fatal injury was widely different among the occupants of various seats. These differences were found to be statistically significant. Generally speaking, the entire rear seat area was less "dangerous" than the front seat area. Further, the dangerous or fatal injury potential of the right front seat was somewhat (although not remarkably) greater than that of the driver's seat.

Table 2—Risk of "Dangerous" or Fatal Injury According to Seat Area Occupied

Seat Area Occupied	Percentage of Occupants with Dangerous or Fatal Injury
Driver *	7.5*
Center front	4.9
Right front	10.4
Left rear	4.7
Center rear	5.2
Right rear	6.4

* Since the Automotive Crash Injury Research sample is one of injury-producing accidents, a driver alone in a car must be injured to get into the sample. To eliminate bias overemphasizing driver injury this table shows frequency of injury among drivers who were accompanied by passengers.

Another influence on the occurrence of dangerous or fatal injury is the area of the car sustaining the principal crash impact. To examine this influence it was necessary to study the frequency of injury among occupants with respect to their proximity to the site of impact. Table 3 shows the wide variations in injury frequency which occurred according to interaction of (1) the location of the impact; (2) the seat occupied; (3) the "closeness" of the seat area to the impact site.

The data show that being near the impact site produced the greatest likelihood of dangerous or fatal injury, regardless of seat area occupied; further, the incidence of the injury varied as a function either of the site of impact or the seat area occupied.

It has been shown that injury may be associated with many accident factors which can be controlled by engineering and design. Ejection, the force localization dictated by objects in a given seat area, and the energy-absorbing qualities of various exterior portions of the car are all subject to effective control

Table 3—Risk of "Dangerous" or Fatal Injury According to Occupants * Proximity to Crash Impact Site

Relation Between Occupant and Crash Impact Site	Area of Car Sustaining Principal Impact	Percentage of Occupants with Dangerous or Fatal Injury	
		Drivers	Right Front Seat Passenger
Opposite impact site	Front	5.6	7.4
At or near impact site	Side	16.7	20.0
Opposite impact site	Side	2.0	8.5
No strict relationship (car rolled over)	Top	3.1	4.5

* Based on nonejected occupants of cars involved in injury-producing accidents.

through engineering. Undoubtedly there are other factors, not yet isolated or discussed here, which may relate to injury cause and may also be controlled by design engineering. It should be realized that such factors often may relate to one another. Similarly, each of these factors may also be related, in some degree, to speed. For example, clinical observation showed that ejection increased as speed increased, or that in a given seat area the frequency of injury increased as speed increased. However, an all-important reservation is that dangerous or fatal injuries increased appreciably from one speed range to the next, starting at the traveling speed range of 50–59 mph. In the lower traveling speed ranges, while there were increases in risk of dangerous or fatal injury, these increases were rather small. However, despite the lower risks of dangerous and fatal injury associated with traveling speeds under 60 mph, it must be recalled that these risks were encountered by the occupants of nearly 75 per cent of the cars studied. In consequence, the actual number of dangerous and fatal injuries observed in this group is just about equal to the number of such injuries among the much smaller group—25 per cent—where occupants were exposed to the higher risks associated with speeds in excess of 60 mph.

An estimation of the part which speed plays in producing dangerous or fatal grades of injury must take the above findings into consideration. The data clearly indicate that the role of speed is a supporting one.

Years of study in the field of automobile crashes have clearly established the fact that an essential causal element associated with injury in an automobile accident is the nature of the object which the human body strikes and what part of the body is involved. Clinical observation clearly indicated that increasing speed could increase the frequency or severity of injury, but that speed as a factor was of lesser importance than the object inflicting the injury. Further, it was apparent that the design of objects which might be struck could be influenced and controlled with a directness and a permanence not possible where speed is concerned. This hypothesis was justified by repeated observation

that some objects, when contacted, easily inflicted injury at almost any speed, and that other objects, when contacted, produced no injury except at relatively high speeds. These clinical observations and hypothetical opinions can now be placed in proper perspective through the statistical procedures adopted in analyzing the data for this study. Data analyses have clearly indicated that control of speed has serious limitations in terms of reducing injuries, because it affects only a proportion of the cars, but that design engineering affects injury in all cars and in all speed ranges. Thus, efforts to reduce dangerous or fatal grades of injury in automobile accidents must take the factors of speed and design engineering into simultaneous consideration.

Summary

A study of the reported impact and traveling speeds of 3,203 cars in injury-producing accidents and correlation with injury data on the 7,154 occupants of these cars revealed:

1. Approximately 74 per cent of the cars involved in injury-producing accidents were traveling at speeds under 60 mph and about 88 per cent involved impact speeds under 60 mph.

2. In injury-producing accidents there was a statistically significant association between increases in both traveling speed and impact speed and the frequency of dangerous or fatal injury. In each of the 10 mph traveling speed ranges through 59 mph the increases in frequency of dangerous or fatal injury were slight; beyond 59 mph the increases rose sharply. Among the occupants of cars traveling above 59 mph (represented by 25 per cent of the cars observed), the frequency of dangerous or fatal injury was nearly three times as great as it was among the car occupants traveling below 59 mph.

3. Complete and absolutely controlled top speed limits would afford relatively limited reduction in the expectancy of dangerous or fatal injuries in injury-producing accidents; strict maintenance of a top traveling speed of 49 mph would still have seen the occurrence of 60 per cent of the dangerous or fatal injuries.

4. Many factors other than speed operated to produce injury in automobile accidents. Acting independently, interdependently, or together with speed were such accident factors as ejection, seat area occupied, and site of crash impact.

5. In the bulk of injury-producing accidents dangerous or fatal injury in low speed ranges—except where ejection occurred—appeared to be very largely a function of the shape and form of interior car components, whether these were struck, and what parts of the human body struck them; such injuries in the higher speed ranges apparently associated with an interacting combination of both the dynamic results of speed and the design of the car.

6. Speed regulation without simultaneous control of car design imposes limitation on the extent of reduction of dangerous or fatal injuries in injury-producing automobile accidents.

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The present report is a revision of a paper initially offered before the Annual Meeting of the Highway Research Board of the National Research Council in Washington, D. C., January 19, 1956. The original paper appears in Highway Research Bulletin No. 142.

It is well to be reminded from time to time of the elements—apparently so "commonsensical"—that make up effective communication. Let not the reader be diverted by the lightness of tone, for the author has something to communicate.

INTRASTAFF COMMUNICATIONS

John W. Stone, D.D.S., M.P.H., F.A.P.H.A.

IN SECOND grade arithmetic we learned that it is impossible to add oranges and apples. The individuals composing the staff of a public health organization may be likened to oranges and apples. Some may even be peaches and occasionally there is a prune or a raspberry.

The various professional backgrounds and training experiences of these persons may complicate seriously all efforts to communicate within the organization. Effective communications, however, govern the effectiveness of the activities of the public health team. Until the individual oranges and apples, and all the others, are joined together in the compote of "teammanship," they retain the exclusiveness that we learned about in the second grade. A compote, by definition, is "various fruits stewed together in sirup." It is not considered essential for the staff to get "stewed together" in order that effective communication may be established, nor should it be interpreted that sirupy words will replace mutual understanding and sincere appreciation. However, the flavor of an otherwise bland public health compote is enhanced markedly by the spice of effective intrastaff communication.

While presuming that the term "intrastaff" is sufficiently well understood so that an etymological consideration is unnecessary, no similar assumption will be made in regard to the word "communication." For, despite the possibility that the many connotations and implications of the word are well recognized, it does seem appropriate that the facet of meaning which pertains to messages and their theory be reviewed in order to furnish a backdrop for the remainder of this presentation.

Communication has been defined as the interchange of thoughts or opinions. Interchange implies that two or more persons are involved in the process. The intrinsic nature of thought requires that it be modified in some manner in order that it may be transmitted from the mind of the sender to the mind of the receiver. Thus, two additional factors are introduced: the need of a method for encoding and decoding the thought in order that, if not identical, at least similar mental images may result, and a medium through which the encoded message may be transmitted. Language and the various art forms are the usual mechanisms employed for coding the various thought units for transmission. And, any organized method for the stimulation of a combination of the five senses may be utilized as an avenue for transmission. The most usual and the most effective mode of communication is a combination of the vocal-aural and the visual. The existence of specialized jargon within the various disciplines in public health frequently complicates

communication to such an extent that decoding the messages is either impossible, or worse, their meanings become garbled.

The nature of messages may run the gamut from the young swain's impassioned declaration, "I love you," to the drill sergeant's order, "Attention!" The message may be merely informational, or it may require a positive response. When the sweetheart of the swain trembles ecstatically or the troop snaps smartly to attention, the communicator has been successful.

The philosophy of teamwork requires the sublimation of individual ambitions and desires to those of the group. Communication, therefore, must be a two-way process. Ideas must move in all directions, not in the helter-skelter manner of the Mad Hatter, but along established channels within the organization. Messages must move downward and laterally as well as upward. It is important that the entire staff be informed, be drawn on, be asked to contribute their judgments, and be given the opportunity to participate. All divisions should be informed at the same time about any matter which concerns the entire organization. Nothing can more quickly destroy or impair a director's sense of leadership than to find that his subordinates are better informed on departmental matters than he.

Each message originates within an individual and, at some moment in time, is thrown into the organizational stream of communication. Its ultimate effect is determined by the appropriateness of the time selected for its projection. Equally important, however, is the accuracy of the thinking from which the message sprang. If the individual cannot think clearly, he cannot communicate effectively. The basis for better communication is to state first of all what is to be done and by whom, and then tell why, where, when, and how.

Intrastaff communication has entered the age of the memorandum. As the activities of the public health organization become more varied, the problems of intrastaff communication become more complex. The increased scope of services and activities usually necessitates, and results in, the expansion of the staff to include many additional new personnel. In the instance of a growing and dynamic organization, there has been such a tremendous influx of new faces that it is no longer possible to rely upon or to employ spoken communication except in specialized instances.

More and more, decisions are being made on the basis of the memorandum, which is a written presentation or report. This is an inescapable part of growth. Continued growth and expansion of public health activity is likely to make the written word even more essential as a time-saving and useful instrument for communicating within the organization. At the time of writing, therefore, it is important to pause and consider the impact of the memorandum upon the staff so that the possibility of misunderstanding or misconception will be minimized or prevented. This kind of writing is not easy, even with practice. But there are ways of making it easier for both the writer and the reader:

Organize your thoughts,
Keep it simple,
Make it easy for the reader,
Put the idea in one sentence,
Cut and condense,
Seek constructive criticism warily,
Get eye appeal.

In written communication, grammar, correct punctuation, and spelling are essential; but they are not the causes of unreadable writing. Some of the causes are trite and pretentious words, long tangled-up sentences, useless repetitions. No member of the staff should become disturbed because he cannot sit down and dictate a clear, complete memorandum at one sitting. Experienced writers go over their copy re-

peatedly. The simpler it reads the more time it takes.

Thus far, this presentation has been concerned primarily with the point of origin of the message, the various forms the message may take, and the various media through which the message may be transmitted. Nothing particular has been said about the receiver, who, to complete the chain of events called communication, must demonstrate simultaneously several attitudes. First of all, he must desire to be communicated with. He must have an empathic understanding for the originator of the message. It may require honest effort on the part of the receiver to decipher the message being directed to him.

A communication, then, requires a communicator or sender who has something to communicate. He will utilize a language which will make possible the transmission of the message to the receiver. The form of the message must be one which the receiver is capable of sensing and interpreting. Clear thinking and team consciousness, on the part of the communicator as well as the receiver, are major factors in a determination of the total effectiveness of the activity known as intrastaff communication.

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Journal of Public Health

EDITORIALS

Human Needs Are Indivisible

Acceptance by the community of some measure of responsibility for the health and welfare of its members, especially those requiring assistance because of ill-health, age, or infirmity, dates far back in history. It is also a matter of common observation and experience that human problems do not occur discretely. One trouble leads to another, setting up vicious circles within families or for individuals. To a very considerable degree, however, community health and welfare services take small account of this fact in their organization. The structure of community services was erected largely without benefit of blueprint. Different parts were constructed at different times to meet different needs. As a result also of professional and agency specialization, the problems of those requiring help may be, and not infrequently are, inadequately handled to the detriment of those in trouble and of the community. An important contribution toward the more effective planning and organization of health and welfare services was the report on the St. Paul study in 1952 by Bradley Buell and his Associates.[1] Since then Buell and his co-workers have carried out a number of other studies all concerned with some aspect of the larger problem of community planning and organization of health and welfare services.[2] The current issue of the Journal has as a supplement the most recent of these studies, which was carried out in Washington County, Maryland. Here the focus is on the important sociomedical problem of indigent disability. The problem was one for which the community accepted responsibility, although no organized, planned approach had been developed to control it. In undertaking this study, the investigators endeavored to apply epidemiological principles to a broad social and medical problem. Furthermore, the investigation was set up not only to establish the nature and dimensions of the problem, but also to determine what could be done about it. One goal was to find out how many of the families, where indigent disability made them a community burden, could be rehabilitated. Another was to develop criteria for the selection of families with rehabilitation potential. Underlying the study is the concept that multiple interlocking health and welfare problems, such as indigence, disability, ill-health, can best be handled within the family framework. Action on the basis of this concept requires, however, the coordination of agency personnel and services. Here too this study breaks new ground by showing how an operation was set up and conducted, which involved representatives from a number of different disciplines, among them physicians, other public health workers, welfare workers, social caseworkers, and other workers concerned with community or-

ganization. With the Washington County project completed, evidence has been developed to show that a reasonable number of families affected by disability and indigency can be rehabilitated.

Both the concept and the methods of the Washington County project are well worth close study. Many American communities are today faced by problems of care for their members affected by long-term illness and disability. Unless community services are planned and organized so as to obtain a maximum of efficiency, effectiveness, and economy, the fruits of knowledge and know-how cannot be fully realized. The Washington County study points in the right direction—human needs are indivisible.

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A Theoretical Model of "Health"

NO MORE basic problem confronts the health administrator than the determination of the state of health of his community. From the time of Petty and Graunt to the present various devices have been used to examine and to determine the state of well-being of groups of people. For the most part, these devices have been concerned with the collection and analysis of vital statistics, with the study of morbidity data, and with information derived from surveys and appraisals of nutrition, administrative practices, environmental sanitation, and the like. None of these sources, however, provides specific indicators of health, in the comprehensive sense in which the term is widely used at present. For characteristic of our time is the increasingly prominent idea of health as a state of being which may be recognized through the establishment and measurement of quantitative dimensions.

A recent endeavor to deal with this problem is available in the report of a study group called together by the World Health Organization to work out indicators for the direct measurement of health.[1] The group felt that health indicators might suitably be classified in three broad categories: those associated with the health status of the individual or group; those concerned with health activities; and those related to environmental conditions. But while recognizing the importance of designing indicators for the direct measurement of health, the working group concluded that, for the present, indicators have to be sought in deviations from health which are susceptible to measurement. Like many another committee, this one suggested further study of the subject, and urged that the search for new indicators should be strenuously pursued, especially through sample surveys using the family as the unit for investigation.

This report is valuable not because it offers any important advances, but rather because it is provocative and leads to reflection on so difficult and yet so basic a subject as the nature of health and its determination in more precise terms than are presently available. While health and disease as concepts have not lacked attention, it is readily apparent from a review of the relevant literature that they continue to elude acceptable and precise definition. Numerous definitions of health have been proposed, some restricted in scope (health as the absence of disease), others all-encompassing (a state of complete physical, mental and social well-being). Examination of the literature also suggests that the ambiguity and confusion surrounding the idea of health are in part due to inappropriate modes of analysis and conceptualization.

No science deals with its objects of study in all their concrete details. Cer-

tain apparently relevant properties are singled out, and attempts made to establish relations among them. The properties are also called attributes, or most generally variables, and are chosen on the basis of conceptual analysis. Applied to health as an object of study, this means that it must be broken up into a number of properties or attributes, and that these must then be translated directly or indirectly into indices or indicators capable of empirical description, classification, or measurement, using the last term in a very broad sense. Such indices could enable one to determine when health is or is not present.

Since health, however, is an abstraction derived from a complex combination of phenomena, rather than a simple and directly observable item, any endeavor to establish characteristic indices must go back to the original phenomena. The latter are manifestations of the functioning of organisms and with these analysis must begin. Biological organisms can be described in terms of structure or process, or more generally as structure-in-process. These aspects can provide properties capable of translation into empirical indices. Furthermore, the abstraction health and its associate, disease, are not distinct states, but rather abstracted facets of the structure-in-process which is the organism. As Aubrey Lewis put it several years ago, health and disease represent "areas in a continuum." [2] It is clear that for different areas of this continuum, and for different aspects of the organism's structure and function, the amount of available information varies. However, such an analysis would go a long way in pointing out where more precise designation, description and measurement of attributes are needed.

What is wanted, in short, is a theoretical model which will incorporate in an organized, logically coherent structure available knowledge concerning the adequate performance of physiological and psychological functions, as well as estimates of the total efficiency of the organism. Furthermore, any estimate of the efficiency of the human organism and of its separate functions must also take into account the environment which supplies it with stimuli and satisfies its needs. This requires, in turn, the consideration of groups of organisms along similar lines.

Fuller detailed development of the lines of thought sketched above is obviously not possible here. Attention can be called, however, to an interesting endeavor in this direction. The concept of endemicity is ancient, but it has never been satisfactorily defined in quantitative terms. In 1957, S. Swaroop described an index of endemicity based on data routinely collected by official health agencies.[3] The purpose of the index is to identify and to rank areas where a disease is always present, even though often at a low level. Thus, areas can be ranked in order of endemic potential and charted in some appropriate manner, perhaps on maps. The data employed by Swaroop include mortality and morbidity rates, spleen rates, or rates based on prevalence in certain areas such as seaports. Cholera is used to illustrate the approach, but the logic may be applied to other health problems.

It is a commonplace that theoretical analysis and the development of hypotheses are indispensable for the advance of scientific knowledge. As Claude Bernard pointed out, "Even mistaken hypotheses are of use in leading to discoveries." It is equally important that theories be as cogently formulated as is possible. Much of this is implied if not explicitly stated in the report of the WHO group. The needs for theory must, however, be explicitly stated. By taking thought we can give rational coherence to known empirical facts, stimulate further investigation, and open wider horizons. And the consequence as in other areas of knowledge will per-

haps be not only the ability to measure, but to a greater degree than is now possible—to predict.

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3. S. Swaroop: Index of Endemicity. Bull. World Health Organization. 16:1083–1101, 1957.

Causation of Cancer

NEOPLASTIC DISEASE is today widely recognized as an important community health problem. This recognition has been sharpened by certain recent developments, notably by the controversy on the role of cigarette smoking in the pathogenesis of lung cancer, which has evoked widespread public interest. Public cognizance, however, is all too frequently focused on the immediately apparent, so that developments of deeper ultimate import tend to receive less attention or even to be overlooked. From time to time, therefore, it is well to be able to stand back and to achieve an overview of the field so as to see trends and developments in perspective. Fortunately, such an opportunity is offered to health workers by a recent issue of the British Medical Bulletin [1] which deals with research on cancer causation, particularly chemical carcinogenesis and the induction of neoplasms by radiation.

During the last decade a number of new directions in cancer research were developed and interest in certain older approaches was revived. For example, views on the role of hormones in carcinogenesis have been very considerably modified owing to progress in endocrinology. Not only have new hormones been recognized and isolated, and the metabolic transformations of many steroid hormones clarified, but there has also been a considerable expansion of knowledge concerning the mechanisms which regulate the secretions of these agents. As a result it has been possible to make use of such recent advances in research on neoplastic disease. The range of known chemical carcinogens is now very wide, and new data about cocarcinogenesis open up attractive possibilities for investigation. The present evidence on exogenous factors in the causation of lung cancer points to the urgent need for fuller chemical investigation not only of tobacco and tobacco smoke, but also of the air of urban centers and industrial complexes.

Starting with the postulate that a chemical carcinogen may enter or become attached to cells that undergo neoplastic change, and thus produce these decisive intrinsic changes, much effort has been expended to discover the nature of the change. Another line of investigation has proceeded on the premise that if cancer is an altered immunological state of the cell, then carcinogenesis must involve some kind of immune mechanism; and a great deal of attention has been given to this type of research. Occupational carcinogens have likewise received fruitful attention. The carcinogenetic action of ionizing radiation was recognized soon after the first medical application of x-rays, but the discovery of nuclear fission in 1939, and its applications since then, have led to vast and unprecedented expansion in the study of radiation carcinogenesis.

There can be no doubt that the study of causation is central to an understanding of the cancer problem. It appears as if the answer to the question of causation may ultimately be given in chemical terms. Whether or not this will be so, certainly all concerned with the problem of cancer should be aware of the trends in research and their possible implications for action on a community basis. Much of this can be gleaned from an attentive reading of the issue of the British Medical Bulletin on the causation of cancer.

1. Causation of Cancer. Brit. M. Bull. 14:73–196, 1958. This issue is also a tribute to Sir Ernest Kennaway, an outstanding contributor to our knowledge of cancer, who died in January, 1958.

APPROVED RESIDENCIES AND FELLOWSHIPS

(Reprinted in part from the Journal of the American Medical Association, October 4, 1958, pages 613-614.)

PREVENTIVE MEDICINE

AVIATION MEDICINE

The following programs in Aviation Medicine have been approved by the Council and the American Board of Preventive Medicine, through the Residency Review Committee for Preventive Medicine, as offering acceptable training in the specialty.

School	Location	Director		Length of Approved Program (Years)	Beginning Stipend (Month)
UNITED STATES AIR FORCE					
Wright-Patterson Air Force Base	Dayton, Ohio	W. F. Hall	For information regarding program, write to: Chief, Medical Division Office Surgeon General, U.S.A.F., Washington 25, D. C.	1	...
School of Aviation Medicine	Randolph Field, Texas	O. O. Benson, Jr.	For information regarding program, write to: Chief, Medical Division Office Surgeon General, U.S.A.F., Washington 25, D. C.	...	...
UNITED STATES NAVY					
School of Aviation Medicine	Pensacola, Fla.	J. C. Early-A. Graybiel	For information regarding program, write to: Director, Graduate Medical Training Bureau of Medicine and Surgery, U. S. Navy, Washington 25, D. C.	2	...
NONFEDERAL					
Ohio State University Medical Center	Columbus, Ohio	W. F. Ashe		3	302

OCCUPATIONAL MEDICINE

The following educational institutions have been approved by the Council and the American Board of Preventive Medicine, through the Residency Review Committee for Preventive Medicine, for THREE years of training in Occupational Medicine. The academic portion of these residencies will be given in the institutions listed. The inplant training is being arranged. For further detailed information concerning a program, it is suggested that the applicant write to the physician in charge of the particular program concerned

School	Location	Physician-in-charge
Yale University Department of Public Health	New Haven, Conn.	J. W. Meigs
University of Rochester School of Medicine and Dentistry	Rochester, N. Y.	J. H. Sterner
University of Cincinnati Institute of Industrial Health, College of Medicine	Cincinnati	R. A. Kehoe
Ohio State University Medical Center, Department of Preventive Medicine	Columbus, Ohio	W. F. Ashe
University of Pittsburgh Graduate School of Public Health	Pittsburgh	A. G. Kammer

PUBLIC HEALTH

Residency programs in Public Health in the following states and cities have been approved for training by the Council and the American Board of Preventive Medicine, through the Residency Review Committee for Preventive Medicine

Department of Health	Location	Director	Local Areas	Population	Length of Approved Program (Years)	Stipend
U. S. Army	6th Army Hdqts. Fort Ord and Presidio of San Francisco, Calif.	G. L. Orth	Military Posts of Fort Ord, Presidio of Monterey, Camp Roberts, Calif.	85,000	1(o)	.....
	1st Army Hdqts. Fort Dix, N. J.	G. R. Carpenter	Fort Dix Military Reservation	30,000	1(j)	.....
	Governor's Island, N. Y.		New England, New Jersey & New York	100,000	....	.....
State of California	Berkeley	M. H. Merrill	Alameda County	739,000	2	530
			Berkeley City	116,500	....	.....
			Contra Costa County	356,700	....	.....
			Los Angeles City	.....	....	.....
			Orange County	511,400	....	.....
			San Diego County	900,400	....	.....
			San Mateo County	377,800	....	.....
			Santa Clara County	395,900	....	.....

NOTE: See pages 1407–1411 (Oct.), American Journal of Public Health for the Guide for Residencies in Public Health.

PUBLIC HEALTH—Continued

Department of Health	Location	Director	Local Areas	Population	Length of Approved Program (Years)	Stipend
State of Delaware	Dover	F. I. Hudson	Kent and New Castle Counties (a)	197,000*	2	500 (b)
State of Florida	Jacksonville	W. T. Sowder	Alachua County	67,300*	2	600
			Dade-Miami	799,700*	....	.....
			Hillsborough-Tampa	345,800*	....	.....
			Palm Beach County	182,800*	....	.....
			Pinellas-St. Petersburg	248,000*	....	.....
State of Georgia	Atlanta	J. H. Venable	(h)	.....	2	.....
State of Illinois	Springfield	R. R. Cross	Cook County (c) (d)	743,988	2	500
			Peoria (City) and Peoria County (d) (e)	174,347	....	.....
			Will County (d)	134,366	....	.....
State of Kansas	Topeka	T. R. Hood	Kansas City-Wyandotte	189,000	2	(f) (r)
			Topeka-Shawnee	115,006	....	.....
			Wichita-Sedgwick	297,388	....	.....
State of Maryland	Baltimore	E. Davens	Anne Arundel County	171,700*	2	542
			Baltimore City	974,000*	....	.....
			Baltimore County	370,400*	....	.....
			Hartford County	66,000*	....	.....
			Montgomery County	256,500*	....	.....
			Washington County	85,700*	....	.....
State of Michigan	Lansing	A. E. Heustis	Calhoun County	135,260	2	400
			Detroit City	1,920,000	....	.....
			Michigan Dept. of Health	(m)	....	.....
State of Minnesota	Minneapolis	R. N. Barr, Secy. and Ex Off.	Minneapolis City	542,000*	2	400
			Olmsted County including Rochester City	48,395*	....	.....
State of Mississippi	Jackson	J. A. Milne	Forrest County	.....	2	.....
			Hinds County	.....	....	.....
New York City	New York City	R. P. Kandle, Dep. Com...	(n)	8,010,000	2	443
State of New York	Albany	H. E. Hilleboe	(l)	941,000	2	511
State of North Carolina	Raleigh	J. W. R. Norton	Charlotte-Mecklenburg County	225,326*	2	.....

PUBLIC HEALTH—Continued

Department of Health	Location	Director	Local Areas	Population	Length of Approved Program (Years)	Stipend
State of North Carolina—(Continued)			Forsyth-Winston-Salem	158,422*	....	.....
			Halifax	59,539*	....	.....
			Orange-Pearson-Chatham-Lee	117,797*	....	.....
			Pitt	63,377*	....	.....
State of Oklahoma	Oklahoma City	J. W. Shackleford	Pottawatomie-Pontotoc Counties.	.....	2	.....
			Tulsa (City) and Tulsa County	.....	....	.....
State of Oregon	Portland	H. M. Erickson	Multnomah County (s)	124,060	2	700(i)
			Clackamas	106,090	....	.....
			Jackson	71,750	....	.....
			Lane	151,690	....	.....
State of Texas	Austin	F. C. Kluth	(g)	596,163	2	660(p)
State of Virginia	Richmond	M. I. Shanholtz	Arlington County	158,410	1	764
State of Washington	Seattle	B. Bucove	Benton-Franklin	.....	2	692
			Bremerton-Kitsap	78,400*	....	.....
			Clark-Skamania	91,000*	....	.....
			King-Seattle	852,700*	....	.....
			Spokane City	188,400*	....	.....
			Tacoma-Pierce County	318,800*	....	.....

* Estimated.
(a) Excludes the city of Wilmington.
(b) To those planning to work in state.
(c) Excludes Chicago, Evanston, Oak Park, Stickney Township, and Winnetka (including Glencoe, Kenilworth, Northbrook, and remainder of New Trier Township), all with full-time health officers.
(d) Assistance can be arranged for securing the MPH degree during or immediately after the first residency year. Appointments can be effective the first of any month. Appointments normally are limited to those training for services in Illinois. Exceptions may be made in special cases.
(e) Training is given under one director in both the City and County Health Departments.
(f) Arrangements for remuneration made on an individual basis.
(g) 43 city-county or county health departments and 6 city health departments in which training may be given depending upon local conditions and the needs and desires of the resident.
(h) State of Georgia with emphasis on 6 major districts.
(i) Assistance can be arranged for securing the MPH degree after successful completion of residency experience. Appointments will be limited to those training for service in Oregon.
(j) Combined one year program Fort Dix Health Center, Fort Dix, N. J., and Headquarters First U. S. Army, Preventive Medicine Division, Governor's Island, New York City, for second year of field training.
(l) Training is given in any one of 10 city health departments, 19 county health departments, or 14 district officers within the state.
(m) Training to be with Michigan Department of Health, with field experience in local health departments.
(n) Includes training at Montefiore Hospital.
(o) Combined one year of training, second year of field training, Fort Ord and Presidio of San Francisco, Calif.
(p) Stipend offered only to those residents who plan to remain in public health work in the state at least six years.
(r) Arrangements for remuneration made upon determination of field of interest and location desired.
(s) City of Portland population (412,100) is not included in this 1957 State Census estimate.

ASSOCIATION NEWS

1958 Sedgwick Award to Dr. Eliot

MARTHA M. ELIOT, M.D.

The Sedgwick Memorial Award, now in its 28th year, conferred for distinguished service in public health, is the highest honor bestowed annually by the American Public Health Association. It honors the memory of William T. Sedgwick, a great public health scholar and teacher, who first inspired many of the later leaders in the field of public health. Among these is this year's recipient whom Professor Sedgwick influenced to choose public health as a career.

We honor tonight Dr. Martha M. Eliot, director of maternal and child health, Harvard University School of Public Health, and formerly chief of the U. S. Children's Bureau and assistant director general of the World Health Organization.

Dr. Martha M. Eliot created a coherent public health program out of the beginnings of the child health movement in this country. She has led child health programs from one success to another. She continues to teach, to guide, and to inspire students and colleagues from all parts of the earth.

Clinical skill brought her an invitation to become Dr. Edwards A. Park's first pediatric resident at Yale. There she made important and original contributions to the understanding of rickets and sharpened her clinical skills. Her approach to a problem in child health reminds one that she has never lost the clinician's first concern for the individual child or the investigator's zeal for new information. All of her work seems to spring from a deep understanding of two closely interwoven concepts—the child as an individual and children in and of a community. She goes to gain firsthand knowledge of a community's children as naturally as she goes to a sick child's bedside. Today in Boston she continues to study community health problems just as she did many years ago in the Dixwell Avenue District in New Haven or, in intervening years, in the 48 states, or in southeast Asia.

Americans, rich and poor, though they know it not, are indebted to her because of her continuing insistence on standards—on quality of medical care. Through her many years as co-chief and chief of the federal Children's Bureau, Dr. Eliot took advantage of federal grants-in-aid funds to bring the fruits of new medical knowledge promptly to the people and to promote a higher quality of medical service for them. These efforts have brought services to areas where they otherwise did not exist; have helped compensate for the unequal distribution of services in rural as compared with urban areas; have stimulated a "team approach" to the complete rehabilitation—social, emotional, and physical—of the handicapped. Such efforts affect the quality of care for which these

funds pay, but also affect the care of many others—old and young, treated by the same physicians and in the same hospitals. Demonstration programs in good maternity care, for the care of the prematurely born, those with impaired hearing, speech defects, rheumatic fever, those needing cardiac surgery, et cetera, have set goals for medical services everywhere. The wartime Emergency Maternity and Infant Care program (EMIC) became a national medical care program that saved thousands of heart aches and untold lives through giving special protection to the health of wives and children of men in the Armed Forces. At the same time it left a permanent mark on standards of care in many parts of the country.

Dr. Eliot is one of those who first grasped the importance of the social factors in health and of the need for bringing the competence of educated social workers to bear on these problems. Her leadership in this field was honored by her election to the presidency of the National Conference of Social Work.

In the development of new programs and in unremitting efforts to "extend and improve" existing services Martha Eliot has encountered, as would be expected, apathy, inertia, and even opposition. She has met them with the firmness and courage that is often characteristic of leaders who are ahead of their times. With faith in the overriding importance of child welfare, in its broadest sense, she has never been fearful of advocating children's interests above special interests. She also has a singular ability to work with the lay citizen and to stimulate a profound human interest in the well-being of children with simplicity, sincerity, dignity, and warmth.

Her vision brought breadth to UNICEF, so that instead of remaining a relief effort it is today helping scientific and technical development in the world's underpriviledged areas. Her tour of duty as assistant director general of WHO stimulated work for children throughout the world.

And so Dr. Eliot has throughout most of her life continued research, teaching, and administration, always with the clear goal of bringing the fruits of research to the service of people. And because she has continually used a keen imagination and the discipline of a scientific training to bear on the social and physical ills of mankind she has succeeded in these efforts and is still blazing trails for those less gifted and less courageous. She is, indeed, a world citizen of whom all Americans can be proud.

The American Public Health Association is proud to honor her, as a Past-President, as a Fellow who year after year has worked on committes, and who today is seeking new goals and ways of meeting them as chairman of its Technical Development Board.

Response by Dr. Eliot

To receive this William T. Sedgwick Medal from the American Public Health Association is, I am well aware, the highest honor that can be bestowed by our Association on a member and tonight I still find myself lost in wonder that it should have come to me. To be added to the long line of Fellows who have been chosen to honor Dr. Sedgwick and, as Dr. Winslow said in 1942, "to keep the laurel green on the memory of a great pioneer in American public health," places upon me a duty that I gladly accept, for I owe a great deal to Dr. Sedgwick even though I saw him but once.

When Dr. Mattison told me that your committee had selected me for this

award my mind leapt back 45 years to a day in the fall of 1913, when, as a young woman just graduated from college, I called on Professor Sedgwick at the Massachusetts Institute of Technology for advice and counsel with respect to my future career. I had been told that Professor Sedgwick was starting to train young people for work in what was called public health, but what this was I did not know. What I did know was that I wanted to study medicine and that many respected friends (including Dr. Richard Cabot) were trying to discourage me from doing so. One of Dr. Sedgwick's close friends and head of the secondary school which I attended had urged me to talk with him. She made the appointment for me, believing, I feel sure, that he would divert me from this, in her mind, rather unfortunate idea I had of studying medicine.

No one could have been more friendly, warm, and wise in his approach to my problem than was Dr. Sedgwick. He was then in his early sixties and at the height of his career, a man respected and honored by his colleagues and friends throughout this country and Europe for his great contribution to the new sanitary science and to epidemiology. Little did I realize from what experience and foresight he was speaking to me on that day in 1913 when I went to see him.

I know now, however, that he was then deeply engaged in the first year's program of that new adventure in professional education—the Harvard-Technology School for Health Officers. My first question to him was, I am sure, not unexpected: "What sort of work will I be able to undertake if I come to study with you?" In response he gave me my first insight into the science and problems of public health, including the control of communicable disease and the tracking down of the source of epidemics, the practice of sanitary science. He told me with enthusiasm of what women were doing to add to this knowledge. I do not remember his speaking of people and how the practice of public health would affect them. He was trying to interest me in bacteriology and its great meaning for the health of the people.

Interesting as it was, I found myself not satisfied and I renewed my questions in a forthright way by asking what course of education and training he would lay out for a young man seeking to make a career of public health. His response was quick and sure. "I would advise him," he said, "to study medicine, to get as good a grounding as possible in what disease does to man, and then to learn and discover how to prevent those diseases." Dr. Sedgkick pressed me to tell him what I wanted to do. On hearing that it was my plan to go to Johns Hopkins Medical School and see where this would lead me, he without hesitation said that this was good and advised me by all means to carry out my plan. I do not doubt that his mind flashed back to his own youth, when in 1877 he made his decision to join, as a student, the group of scientists who had just been gathered together at Hopkins by President Gilman to initiate the research and teaching that were to become the foundation of the work of that newest and, for that day, the most adventurous of universities in this country.

Though Dr. Sedgwick was first and foremost a biologist and sanitary scientist, I know now that the range of his interest spread far and wide and included the behavior of all living animals, including man and his "conduct." In a report of a talk which he gave to a group of students of biology about 1907, light is thrown on the way he thought about biology as the all-inclusive study of man. "The first of the sciences to be developed," he said, "were astronomy and mathematics; then physics; then chemistry and geology; and last of all biology and engineering . . ." "Man,"

he went on, "a living thing and an animal, studies for centures everything except biology and animal life. He studies the science of relation, the science of space and the science of numbers; he studies the far off heavens and eventually the earth under his feet, but he postpones to the last any thorough knowledge of himself and his own relations, the lower animals, and plants. At last, however, he begins to study himself and the living world to which he belongs, and, having examined his structure and considered his origin, finally takes up the study of behavior." Dr. Sedgwick was concerned with "the behavior of mankind as individuals and as nations, our reactions to climate . . . proverty and wealth . . . industry and idleness . . . polluted water . . . smoke . . . sunlight . . . darkness."

The talk I had with Dr. Sedgwick was the only time I ever saw him. His advice to me to go ahead with my plan to get a thorough grounding in medicine was indicative of his far-sighted understanding of what the future held for public health. Already, in 1913, the study of public health was multiprofessional for he, a biologist, and Dr. Milton Rosenau, a physician, had gathered about them a faculty and student body of bacteriologists, physicians, epidemiologists, engineers, sanitarians, physiologists, health educators, and others to teach and learn at the new School for Health Officers. His own emphasis on biology remained intact, but it was a broader concept of biology than that held by most biologists for it included, I believe, elements of what we today term the social sciences—the behavior of man. Parenthetically I might add how interested I believe Dr. Sedgwick would have been and how much he would have delighted in Edward Steichen's incomparable collection of photographs of people and their feelings and behavior, called "The Family of Man."

Even in my unsophisticated youth, I recognized in Dr. Sedgwick a man of great imagination, magnetism, wisdom, patience and vision, and a kindly counselor of the young. Over the years since that day I have learned more about him from my reading and my contacts with his former students, but that one talk with him I have cherished, and its influence on me has been lasting beyond anything I recognized at the time. I am glad to be able to express now my great gratitude to him.

NEWS OF AFFILIATED SOCIETIES AND BRANCHES

New Mexico Wants Housing Funds

The 30th Annual Meeting of the New Mexico Public Health Association met in Clovis May 5–7. Among the chief subjects discussed were mental health, chronic disease control in rural areas, accident prevention, and radiological health. On a panel on "Health Education—Everyone's Duty" citizen participants were a businessman, a teacher, a funeral director, a minister, and a county commissioner. Public health specialists included a county nurse, a state sanitarian, and the state health commissioner.

Among the resolutions passed at the business meeting was one urging the state legislature to pass the necessary legislation to enable the state to take advantage of available federal funds for urban renewal and housing programs. Others urged the Executive Board to appoint a committee to study the feasibility of joint meetings with the New Mexico Conference on Social Welfare and other health and welfare agencies.

Two citations were awarded to members of the State Health Department staff:

Portia Irick, R.N., director of public health nursing, for outstanding, sustained leadership, and service for a period of the last five years.

Stanley J. Leland, M.D., state health officer, for outstanding leadership, ability, and vision in service to public health in New Mexico for the year 1957.

Officers elected are as follows:

President: Marion Hotopp, M.D., M.P.H., director, Division of Maternal and Child Health, State Department of Health, Santa Fe

President-Elect: Tom Proctor, senior milk sanitarian, State Department of Health, Clovis

Vice-President: Abenell Benton, district health nurse, Curry County

Secretary-Treasurer: Daniel T. Marley, executive director, Bernalillo County Tuberculosis and Health Association

Librarian: Daniel E. Johnson, Ph.D., consultant, Public Health Laboratory, State Health Department, Albuquerque

White Plains Regional Conference

The second annual White Plains Regional Conference of Public Health Workers, sponsored by the New York State Public Health Association, was held September 10, 1958, at Adelphi College, with an attendance of about 200. The theme was "Changing Patterns in Community Health Services." Keynote talks were given by Ethel Alpenfels, Sc.D., professor of educational sociology, New York University, on "Changing Community Patterns," and Herman E. Hilleboe, M.D., state commissioner of health, on "Adjusting Health Services to Meet Changing Community Patterns." It was interesting to note that although the two speakers had not seen each others papers, what they had to say dovetailed as though planned. The adjustments in health services suggested by Dr. Hilleboe were exactly those things that needed to be done in the light of the changing community patterns described by Dr. Alpenfels.

Round table discussions were held on: "Social Sciences and Community Health Services," "Are Changing Patterns in Education of Health Personnel Meeting Community Needs?," "Changing Environment—An Impact on Community Health," and "Changing Role of the Citizen in Community Health."

The planning for this conference was done in large part by Nassau and Suffolk County public health workers who were also the chief participants in the round table discussions. Berwyn F. Mattison, M.D., executive secretary of the APHA, was a team member of the panel that discussed changing patterns in education; Francis B. Elder, engineering associate, was moderator for the round table on changing environment.

APHA AFFILIATED SOCIETIES AND BRANCHES

Society and Secretary

ALABAMA PUBLIC HEALTH ASSOCIATION, Norma L. Chandler, State Health Dept., Montgomery
ARIZONA PUBLIC HEALTH ASSOCIATION, Mrs. Verona Massey, State Dept. of Health, Phoenix
ARKANSAS PUBLIC HEALTH ASSOCIATION, Mrs. Vada Russell, State Health Dept. Bldg., Little Rock
CALIFORNIA, NORTHERN, PUBLIC HEALTH ASSOCIATION, Mrs. Dalrie S. Lichtenstiger, 130 Hays St., San Francisco, Calif.
CALIFORNIA, SOUTHERN, PUBLIC HEALTH ASSOCIATION, Byron O. Mork, M.D., University of California at Los Angeles, Los Angeles
COLORADO PUBLIC HEALTH ASSOCIATION, Alice de Bruyn Kops, 4660 S. Delaware, Englewood, Colo.
CONNECTICUT PUBLIC HEALTH ASSOCIATION, E. Louise Ratcliff, M.P.H., Griffin Hospital, Derby
CUBAN PUBLIC HEALTH SOCIETY, Dr. Raphael Calvo Fonseca, Calle 19 No. 511 Altos Vedado, Havana
FLORIDA PUBLIC HEALTH ASSOCIATION, Nathan J. Schneider, Ph.D., P. O. Box 210, Jacksonville
GEORGIA PUBLIC HEALTH ASSOCIATION, Carl Fox, 33 Pryor St., N.E., Atlanta
IDAHO PUBLIC HEALTH ASSOCIATION, Wesley O. Young, D.M.D., P. O. Box 640, Boise
ILLINOIS PUBLIC HEALTH ASSOCIATION, William J. Hixon, Evanston Health Dept., Evanston
INDIANA PUBLIC HEALTH ASSOCIATION, Gale E. Coons, State Board of Health, Indianapolis
IOWA PUBLIC HEALTH ASSOCIATION, Mary L. Wombacher, State Dept. of Health, Des Moines
KANSAS PUBLIC HEALTH ASSOCIATION, Evelyn Ford, State Board of Health, State Office Bldg., Topeka
KENTUCKY PUBLIC HEALTH ASSOCIATION, Mrs. Rosalie Walters, 620 S. Third St., Louisville 2
LOUISIANA PUBLIC HEALTH ASSOCIATION, Andrew Hedmeg, M.D., State Dept. of Health, New Orleans 7
MARYLAND PUBLIC HEALTH ASSOCIATION, Lillian B. Davis, Sc.D., Department of Health Education, Baltimore
MASSACHUSETTS PUBLIC HEALTH ASSOCIATION, Mrs. Elizabeth K. Caso, Dept. of Health, Cambridge
MICHIGAN PUBLIC HEALTH ASSOCIATION, Maurice J. Mayer, 405 Hollister Bldg., Lansing
MINNESOTA PUBLIC HEALTH CONFERENCE, D. S. Fleming, M.D., State Dept. of Health, University Campus, Minneapolis
MISSISSIPPI PUBLIC HEALTH ASSOCIATION, H. E. Boone, P. O. Box 1700, Jackson
MISSOURI PUBLIC HEALTH ASSOCIATION, Mrs. Nadia Craver, 5th Fl., State Office Bldg., Jefferson City
MONTANA PUBLIC HEALTH ASSOCIATION, Elizabeth Bishop, M.D., P. O. Box 638, Hardin
NEBRASKA PUBLIC HEALTH ASSOCIATION, Orville D. DeFrain, Lincoln-Lancaster County Health Dept., Lincoln
NEW MEXICO PUBLIC HEALTH ASSOCIATION, Daniel T. Marley, P. O. Box 8066, Albuquerque
NEW YORK CITY, PUBLIC HEALTH ASSOCIATION OF, Allan Marlowe, 295 Flatbush Ave., Brooklyn 1
NEW YORK STATE PUBLIC HEALTH ASSOCIATION, Mrs. Kathleen Boland, State Dept. of Health, 84 Holland Ave., Albany
NORTH CAROLINA PUBLIC HEALTH ASSOCIATION, R. W. Brown, Bucombe County Health Dept., Asheville
NORTH DAKOTA PUBLIC HEALTH ASSOCIATION, Jean E. Norton, R.N., Box 133, Bismarck
OHIO PUBLIC HEALTH ASSOCIATION, Virginia Jones, Ohio Dept. of Health, Dayton
OKLAHOMA PUBLIC HEALTH ASSOCIATION, Marjorie Butler, 3400 North Eastern, Oklahoma City
OREGON PUBLIC HEALTH ASSOCIATION, Christie Corbett, R.N., State Board of Health, Portland
PENNSYLVANIA PUBLIC HEALTH ASSOCIATION, Emma J. Petach, R.N., 324 N. Second St., Harrisburg
PUERTO RICO PUBLIC HEALTH ASSOCIATION, Mrs. Luisa L. Trinidad, Santurce
SOUTH CAROLINA PUBLIC HEALTH ASSOCIATION, Mrs. Laura M. DeMarse, State Health Dept., Columbia
SOUTH DAKOTA PUBLIC HEALTH ASSOCIATION, Alice Brady, R.N., State Dept. of Health, Pierre
TENNESSEE PUBLIC HEALTH ASSOCIATION, C. B. Tucker, M.D., State Dept. of Health, 420 Sixth Ave., N., Nashville
TEXAS PUBLIC HEALTH ASSOCIATION, Wayne H. Garrett, City Hall, Fort Worth
UTAH PUBLIC HEALTH ASSOCIATION, Mrs. Virginia Cole, City Health Dept., 115 S. State St., Salt Lake City
VIRGINIA PUBLIC HEALTH ASSOCIATION, William A. Dorsey, P. O. Box 2088, Richmond
WASHINGTON STATE PUBLIC HEALTH ASSOCIATION, Jack E. Mathews, State Dept. of Health, Smith Tower, Seattle
WEST VIRGINIA PUBLIC HEALTH ASSOCIATION, Paul B. Shanks, State Health Dept., Charleston
WISCONSIN ASSOCIATION FOR PUBLIC HEALTH, Paul Weis, 1 W. Wilson St., Madison
SOUTHERN BRANCH, A.P.H.A., Betty Ficquett, State Board of Health, Columbia, S. C.
WESTERN BRANCH, A.P.H.A., Mrs. L. Amy Darter, State Dept. of Health, 2151 Berkeley Way, Berkeley, Calif.

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EMPLOYMENT SERVICE

The following pages present information for those seeking public health personnel and for those seeking positions in public health. Other information concerning vacancies and personnel available is on file in the Association office. Anyone wishing to have the benefit of this additional information can obtain it by writing to the Vocational Counseling and Placement Service of the Association.

Advertising space in these pages is available at special rates for the use of employers or individuals. The charges are $5 for the first 50 words or fraction thereof and $1 for each additional 10 words or fraction thereof. There is no charge to members or Fellows of the Association who desire to utilize the **Positions Wanted** portion of these pages. **Closing date** for receipt of advertisements is the first of the month preceding the desired month of publication. **All correspondence should be sent to the American Public Health Association, 1790 Broadway, New York 19, N. Y.**

POSITIONS AVAILABLE

Medical Health Officer—for Jefferson County Health Department (population 105,000). Offices in Golden, Colo., site of Colorado School of Mines. This unit has a well trained staff of nurses and sanitarians. Qualifications require an M.P.H. and experience in the field of public health. Salary starts at $11,772. Address inquiries to Dalton Roberts, Chief, Administrative Services, Colorado State Department of Public Health, 420 State Office Bldg., Denver 2, Colo.

Public Health Physicians—for overseas employment. Salary range $9,000–$15,000, plus housing and other allowances where applicable. Minimum qualifications are formal training or experience in public health, preferably both for top-level positions. Assignments will be for a minimum of two years. Write Public Health Division, Box 100, International Cooperation Administration, Washington 25, D. C.

Psychiatrists—Federal government retirement plan, insurance, annual and sick leave provisions. No restriction on part-time practice during hours outside of regular work time. (1) **Chief, Child Guidance Clinic**—Director of a treatment-oriented facility comprised of two psychiatrists, two psychologists, two psychiatric social workers. Must be Board eligible; two years' specialized training in child psychiatry required. Salary $11,595 per annum, plus contract for special project leadership in exceptionally bright children with emotional problems for additional $3,600 per annum for three years. (2) **Chief of Community Mental Health Clinic**—for northeast Washington. To conduct a varied program in clinic to be established utilizing psychiatrist, psychologist, social worker. Emphasis on community mental health; clinical work with children and adults. Must be Board certified. (3) **Staff Psychiatrist**—Legal psychiatric services, providing diagnostic and consultative services to law enforcement agencies of the District of Columbia. Work on a staff composed of three psychiatrists, two clinical psychologists, and two psychiatric social workers. Must be Board eligible. Salary $10,130 per annum. Write Director, D. C. Department of Public Health, 300 Indiana Ave., N.W., Washington 1, D. C., Attention: Marvin E. Perkins, M.D.

Public Health Dentist—Philadelphia Department of Public Health is seeking a public health dentist to assist in direction of dental program. Salary $9,126 to start. Retirement plan, free medical plan and life insurance, liberal holiday, sick leave and vacation benefits. Required: United States citizenship, D.D.S., plus M.P.H. and two years' professional experience, including one year in a supervised public health program. Inquire: J. M. Wisan, D.D.S., Director, Division of Dental Health, Room 527, City Hall Annex, Philadelphia 7, Pa.

Health Statistician—to render consultant services in programs and projects of the Pan American Sanitary Bureau, Regional Office of the World Health Organization, with assignment to a Latin-American country and travel to neighboring countries. Requirements: professional degree, M.D., Ph.D., or equivalent in public health, with specialization and experience in health statistics. Attractive salary and allowances. For further details write to Personnel Officer, PASB/WHO, 1501 New Hampshire Ave., N.W., Washington 6, D. C.

Wanted: **Health Officers**—for local units in Florida. **Health Officer IV,** $11,040–$13,800; **Health Officer III,** $10,080–$12,600; **Health Officer II,** $9,120–$11,520; **Health Officer I,** $7,200–$9,120. Each applicant is rated on a basis of experience and training. Good state retirement, plus Social Security; merit system protection; travel allowance ten cents per mile; 40-hour week; work in vacation surroundings. Apply to Wilson T. Sowder, M.D., State Health Officer, P. O. Box 210, Jacksonville 1, Fla.

City Public Health Director—Evanston, Ill. M.D. and D.P.H. degrees desired. Twenty-five personnel in department. Council-manager

government. Salary $11,000–$14,000. Affiliation possible with high school district. Population 75,000, 8.2 square mile area; city on Lake Michigan north of Chicago. Home of Northwestern University. Apply to Bert W. Johnson, City Manager, Evanston, Ill.

Medical Health Officer—for a two-county area in the Upper Peninsula of Michigan. Good personnel policies and vacation. Salary range $13,500–$15,000, according to qualifications and experience. Total population of area 56,000. Counties border on Lake Michigan. For further information write to Delta Menominee District Health Department, Webster Annex, Escanaba, Mich.

Child Psychiatrist—Interested in academic career with opportunity to conduct a mental hygiene clinic for preschool children. Academic title and research opportunity with excellent salary. Three years' accredited residency in psychiatry and at least two years' postresidence experience with one year minimum in child psychiatry. Apply Dr. S. Mouchly Small, School of Medicine, University of Buffalo, Buffalo 14, N. Y.

Tuberculosis Control Officer—for Houston and Harris County, Tex. Salary $12,000. Must be experienced in tuberculosis and epidemiology. Retirement, Social Security, and hospital insurance. Apply to L. D. Farragut, M.D., 1120 Franklin St., Houston 14, Tex.

District Health Officer, Wisconsin—Two positions. Headquarters Rhinelander and Fond du Lac. M.P.H. degree and eligibility for license to practice medicine in Wisconsin required. Salary $10,464–$14,484, commensurate with experience. Write E. H. Jorris, M.D., Assistant State Health Officer, 400 State Office Bldg., Madison 2, Wis.

Director, Local Health Services, Wisconsin—Work with the state health officer and professional staff in improvement of local health services. M.P.H. degree and eligibility for license to practice medicine in Wisconsin required. Salary $10,464–$14,484, commensurate with experience. Write E. H. Jorris, M.D., Assistant State Health Officer, 400 State Office Bldg., Madison 2, Wis.

Public Health Nursing Consultant—to work in a generalized program. Bachelor's degree in public health nursing. Three years' experience in public health nursing, one of which was under supervision and one of which included supervisory responsibilities. Liberal personnel policies. Salary $420–$525 per month plus mileage and per diem. Further information and application form may be obtained from Personnel Officer, State Health Department, State Office Bldg., Montgomery 4, Ala.

Public Health Nurse—Immediate opening with the Florida Crippled Children's Commission. Salary $360–$460 per month, plus generous travel allowance, liberal vacation and sick leave policies. Covered by state retirement, Social Security, and merit system. Requirements: registered or eligible for registration in Florida; three years' experience in public health nursing; one year approved study in public health nursing. No orthopedic or pediatric training required. Apply Florida Crippled Children's Commission, P. O. Box 1028, Tallahassee, Fla.

Public Health Nurse—for a municipal health department, to do both field work and teaching. Car allowance. Salary $4,813–$5,540 per year. For application and further information write to Department of Personnel, City Hall, Dearborn, Mich.

Public Health Pediatric Nursing Consultant—for the Missouri State Division of Health, Jefferson City, Mo. To participate in the planning and the development of nursing services with particular emphasis on the health of school-age children; to give consultant service to state, county, and local school administrators in regard to health programs in schools. Requirements: five years' public health nursing experience, including two years in a supervisory, consultative, or administrative capacity; B.S. degree in nursing which included or was supplemented by at least one year's approved program of study in public health nursing and an advanced clinical program of study in pediatric nursing or maternal and child health. Salary range $5,124–$6,864, travel allowance, state retirement, and Social Security. Merit system provisions for vacation and sick leave. Apply: William J. Cassel, Jr., M.D., M.P.H., Bureau of Maternal and Child Health, Division of Health, State Office Bldg., Jefferson City, Mo.

Director of Nurses—for newly formed county health department, population approximately 100,000. Beginning salary $5,600 per annum. Write to Dr. Neil Gordon, Commissioner, Chemung County Health Department, 203–209 William St., Elmira, N. Y.

Public Health Nurses—Beginning salary $4,440. **Graduate Nurses**—Beginning salary $4,020. Five-day work week from 8:30 a.m. to 4:30 p.m. Four weeks' vacation, 11 holidays, 12 days' sick leave annually. Pension plan. Generalized public health nursing agency founded by Lillian D. Wald. Ongoing inservice education program. Four universities offer opportunities for study at all levels. Some scholarship assistance available. For information, write or call Personnel Office, Visiting Nurse Service of New York, 107 East 70th St., New York 21, N. Y. Telephone Lehigh 5–1100.

Public Health Nurse Supervisor—Excellent opportunity. Liberal personnel policies.

Salary range $4,600–$5,980. Generalized program, including rehabilitation, industry, nursery schools, parents classes, and crippled children's clinics. Highly industrialized and agricultural community in southeast central Pennsylvania—50 miles from Baltimore, 90 miles from Philadelphia and Washington. Write Director, Visiting Nurse Association, 218 E. Market St., York, Pa.

Public Health Nursing Consultant—State level generalized public health nursing consultant. Experience in public health nursing supervision and master's degree required. Apply Division of Public Health Nursing, Wyoming Department of Public Health, State Office Bldg., Cheyenne, Wyo.

Animal Ecologist—Vacancy on the island of Hawaii with the plague research program of the Territory of Hawaii Department of Health. Requires seven years of professional research experience in zoology, mammalogy, animal ecology, or entomology of which two years shall have involved planning and conducting research projects, and graduation from a college or university of recognized standing with a master's degree in zoology, mammalogy, entomology, or a related biological science, or any equivalent combination of experience and training. Appointments may be made at any salary interval between $487 and $570 per month at which a qualified applicant can be recruited. Continuous recruitment until need is met. For additional information and application write to Mrs. Loretta Fukuda, Recruiting and Examining Supervisor, Department of Civil Service, Territory of Hawaii, 825 Mililani St., Honolulu 13, Hawaii.

Virologist—State Virus Laboratory. Master's degree with virus training and two years' experience. Salary $440–$550. Entrance step dependent on qualifications. Excellent opportunity in diagnostic and research activities in newly established and well equipped laboratory. State Board of Health, Helena, Mont.

Sanitary Engineers—for overseas employment. Salary range $8,000–$13,000, plus housing and other allowances where applicable. Qualifications include degree in sanitary engineering or public health for subordinate positions, plus appropriate experience for greater responsibility. Assignments will be for a minimum of two years. Write Public Health Division, Box 100, International Cooperation Administration, Washington 25, D. C.

Public Health Engineer or Sanitary Engineer—or other related academic background and experience. At Pennsylvania State University. Advanced degree desirable. Responsibilities include coordination of existing programs in sanitation, waste handling, inspection procedures, etc., and organization and planning of future programs. Also, some instruction in proper sanitation practices to employees and students. Other related duties. Write Employment Division, 304 Old Main Bldg., Pennsylvania State University, University Park, State College, Pa.

Public Health Engineer II—Qualifications: master's degree with at least two years of experience in a state or local health department. Duties: direction of activities of the Sanitation Division, one of three major divisions of the Bureau of Environmental Sanitation, supervision of 37 employees. Civil service position. Vacation, sick leave, medical and hospital insurance, and liberal pension plan. Salary range $7,371–$7,987. Write to E. R. Krumbiegel, M.D., Commissioner of Health, Milwaukee Health Department, 200 E. Wells St., Milwaukee 2, Wis.

Sanitarians—Philadelphia Department of Public Health has openings for sanitarians with or without experience. Salary $5,045 to start. Generalized program. Retirement plan, free medical plan and life insurance, liberal holiday, sick leave and vacation benefits. Required: United States citizenship, graduation from four-year college or university with major in sanitary science, dairy, or food technology. Other degrees will be considered with experience. Address inquiries to Myrna J. Katin, Personnel Officer, Philadelphia Department of Public Health, Room 504, City Hall Annex, Philadelphia 7, Pa.

Public Health Educator I—Qualifications: college degree with at least one year of postgraduate study in public health education and at least one year's experience in a public or voluntary health agency. Duties: carrying ont health education programs under the direction of Health Educator II. Salary range $5,271–$6,030. Civil service position. Vacation, sick leave, medical and hospital insurance, and liberal pension plan. Write to E. R. Krumbiegel, M.D., Commissioner of Health, Milwaukee Health Department, 200 E. Wells St., Milwaukee 2, Wis.

Public Health Educator II—Initiate and develop school-community health education programs. Desirable qualifications: formal training and experience in public health; sound working knowledge of principles of education and methods of teaching. Salary $5,424–$6,504 per year. Travel allowance, vacation, sick leave, retirement benefits, group insurance plans. Write Dr. Amy L. Hunter, Director, Bureau of Maternal and Child Health, Wisconsin State Board of Health, Madison 2, Wis.

Director—for a southwestern Michigan county health department serving a population of 135,000. Long-established, unusually well organized department, with progressive programs; utilized as a training center. Desirable location and living conditions; good personnel policies, retirement plan. Salary open. Mas-

ter's degree, experience in public health administration, and eligibility for Michigan medical licensure required. Address inquiry to the Director, Division of Local Health Administration, Michigan Department of Health, Lansing 4, Mich.

Public Health Nurses ($395–$489) and Senior Public Health Nurses ($440–$545)—Must have valid certificate of registration as a nurse in California and certificate as a public health nurse issued by California Board of Public Health and California Motor Vehicle Operator's License. Senior must have, in addition, one year public health nursing experience in the Orange County Health Department or two years' public health nursing experience in an equivalent program. Write Orange County Personnel Office, 801-C North Broadway, Santa Ana, Calif.

Public Health Nurses—for rural areas of Colorado. Salary $325–$350 per month, depending on experience and training in public health. Excellent personnel policies, including generous mileage allowance for car. Educational stipends available. Apply: Colorado State Department of Public Health, Nursing Section, 1422 Grant St., Denver 3, Colo.

Public Health Nurse and Public Health Nurse Consultant Vacancies—Connecticut Department of Health. Thirty-five hour week, liberal vacation, sick leave, Social Security, and state retirement benefits, annual salary increments. **Public Health Nurse**—Minimum requirements include completion of at least one year's approved program of study in public health nursing carrying academic credit and one year's employment in generalized public health nursing under qualified supervision. Starting salary $4,080, maximum $5,340. **Public Health Nurse Consultant**—Minimum requirements include bachelor's degree in public health nursing and two years' employment in generalized public health nursing, including one year under direct qualified supervision and one year in a supervisory capacity. Starting salary $4,740, maximum $5,820. Reply to Bradley Dearington, Connecticut Health Department, Room 324, State Office Bldg., Hartford, Conn., or to State Personnel Department, State Office Bldg., Hartford.

Public Health Nurses—Ten-nurse agency, generalized service, under supervision, beginning salary $4,630, 35-hour week, three weeks' vacation, retirement plan, and Social Security. Apply to Director of Nurses, Mount Vernon Department of Health, Mount Vernon, N. Y.

Opportunities for **Health Educators,** Florida—Travel allowance, vacation, sick leave, state retirement, Social Security, hospitalization (optional). **Health Educator I**—($3,600–$4,560), B.S. in education, social work, or nursing. A central county health department (in citrus area, urban-rural). **Health Educator II**—($4,140–$5,280), B.S., with an M.P.H. in public health or health education, or an equivalency of five years in teaching science. An east coast county health department (fastest growing). Apply to Miss Elizabeth Reed, Director, Division of Health Information, Florida State Board of Health, P. O. Box 210, Jacksonville, Fla.

POSITIONS WANTED

On Box Numbers, Address APHA at 1790 Broadway, New York 19, N. Y.

Biostatistician—Available for research/teaching duties in biological or basic medical sciences. **Box ST-18,** Employment Service, APHA.

Administration or Education—B.S., M.S. (hospital administration with courses in public health). Navy hospital corps veteran, 28, married, children. Some administrative experience. Challenge, not salary, important. Prefer rural location, East. **Box C-41,** Employment Service, APHA.

Commercial Advertisements

All communications on the following commercial advertisements should be sent to Burneice Larson, Medical Bureau, Suite 605, 900 North Michigan Avenue, Chicago 11, Ill.

OPPORTUNITIES AVAILABLE

(a) Young board internist to become clinical director, health service, also act as assistant director; 20,000 students; expansion program; Midwest; $15,000. (b) Physician to direct new county health department; West. (c) Public health director; residential suburb, 75,000; university, four colleges, modern council-manager form of city government widely known for its progressive methods of providing municipal services to its citizens; Midwest. (d) Student health physician; Southwest. (e) Industrial hygienist and sanitarian; minimum, B.S. degrees required; foreign operations, large industrial company; salaries, respectively, $1,150 and $955 monthly. (f) Assistant director of health education; state health department, West. (g) Public health nursing instructor; collegiate school; southern medical center; $6,400–$10,000. (h) Two school nurses; degrees in public health nursing required; near Chicago; up to $7,200.

OPPORTUNITIES WANTED

(a) Public health and medical administrator; distinguished career; currently in charge of important study project which will be completed soon. (b) Health educator; B.S., M.S., M.P.H.; three years, chief bacteriologist, state department of health; three years, health educator, county health and tuberculosis association.

BOOKS AND REPORTS

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted.

GUIDE FOR THE PREVENTION AND CONTROL OF INFECTIONS IN HOSPITALS—By the New York State Department of Health (A joint project of the New York State Department of Health and the American Public Health Association) Albany, N. Y.: Health Education Service (P.O. Box 5283, Capitol Station), 1958. 56 pp. Price, $.50.

Brevity and the attractive format of the 1957 revision of this guide will please the busy hospital administrators, physicians, surgeons, nurses, hospital housekeepers, and public health officials who are now forced to tarry in their conquest of new health problems to consider the oft-forgotten but never-absent nemesis of good medical care: hospital-acquired infection. Many of the familiar names of yesterday—diphtheria, tetanus, smallpox, typhoid—no longer dismay those concerned with protecting hospital patients from infection; but antibiotic-resistant staphylococci do. Furthermore, for the present at least, prevention of staphylococcal disease depends upon improving hospital hygiene. The Guide will be of value in this task.

The consideration of preventive measures under the five general principles: (1) clean and aseptic technic, (2) recognition of infections in patients and personnel, (3) isolation, (4) immunization, and (5) drugs and antibiotics will clarify the thinking of many. Classification of diseases according to the need for private room, cubicle, open ward, masking, gowning, and handwashing should be especially helpful to nurses and hospital administrators. Detailed instructions concerning such basic procedures as handwashing, gown technic, masks, disposal of wastes, care of dishes, linen, floors and equipment should especially delight nurse educators. This Guide can replace the parry with which harried health officials have sometimes met the requests of equally harried hospital administrators for specific information which would assist them in the task of preventing transmission of microparasites in hospitals.

Yet the present edition will not answer important questions such as: (1) What specific epidemiologic and bacteriologic technics should hospitals use to measure the success and failure of their efforts? (2) What type of chemical agent is best for general hospital disinfection? (3) What are the optimum methods of achieving frequent, routine, and adequate disinfection of such important environmental components as nurseries, utility rooms, mattresses and blankets? (4) What are acceptable standards for air hygiene in surgical and dressing rooms?

The 1957 Guide is an important step forward and will certainly be useful to many, but it should soon be revised again to satisfy the current rapid increase in need for specific guidance in the prevention of hospital-acquired infection. R. T. RAVENHOLT

SIMPLIFIED DIET MANUAL WITH MEAL PATTERNS—Prepared by the Nutrition Service of the Iowa State Department of Health in cooperation with the Iowa Dietetic Association. Ames, Iowa: Iowa State College Press (Press Building), 1958. 90 pp. Price, $1.95.

This excellent compilation of diets and menu patterns for use by physicians and related personnel is simple, concise, and compact in size. It is based on recent authoritative material reviewed by a committee of the Iowa Dietetic Association and has been used on a trial basis by ten hospitals listed in the Acknowledgments. It includes an introduction, "How Food Groups Contribute Nutrients, the General Diet and

Modified Diets" that are most frequently used. An interesting addition is the "Diet for Older People."

With few exceptions each diet is planned to "provide the level of nutrients recommended for the average person by the National Research Council." To accomplish this some of the diets are more liberal and more attractive than those usually found in acute hospitals. The Low Residue Diet, for example, includes two cups of milk and some whole canned fruits. No Nonresidue Diet is included. This leniency, however, makes the manual particularly well suited for chronic patients who must remain on a restricted diet for indefinite periods of time.

The dietary explanations are explicit and practical and require little additional instruction with the exception of the Diabetic Diets. Single diets are available to physicians as separate leaflets for issuing to patients.

This is one of the most up-to-date and useful compilations that has been published in this subject area. It is geared for use by physicians, dietitians, nutritionists, and public health personnel. Small hospitals and nursing homes, particularly those without the services of a dietitian, would find this a reliable diet manual to use, subject to approval of the physician in charge.

HELEN E. WALSH

AN APPROACH TO THE PREVENTION OF DISABILITY FROM CHRONIC PSYCHOSES—The Open Mental Hospital Within the Community. New York: Milbank Memorial Fund (40 Wall Street), 1958. 80 pp. Price, $1.00.

This small volume of three papers presented at the second meeting of the Advisory Council on Mental Health Demonstrations of the Milbank Memorial Fund provides interesting and provocative material on a subject of current interest in the mental health field. The papers concern themselves with the open mental hospital as an approach to the prevention of disability from chronic psychoses.

In the first paper, Dr. Hunt describes in an exciting manner an approach to the problem of mental illness which is gaining more and more acceptance. That is the prevention and reduction of disability associated with psychotic illness. The program outlined is a result of Dr. Hunt's study of the operation of such programs in England as well as his experience in instituting such a program in a state mental hospital. The major emphasis is the shift away from the purely custodial role of the hospital to that of an active rehabilitation program in which it is suggested that the treatment and custodial functions of the hospital be returned to the community.

Dr. Macmillan's paper is a first hand description of the development of an integrated hospital community relationship. Its history and growth are detailed. Much information is given on its actual operation with some figures, but the figures leave one with many unanswered questions such as how often patients of various types are seen and by whom.

The final paper by Dr. Felix is a provocative social document which raises some of the legal implications of a program as described in the first two papers.

The book is well worth reading by those interested in mental health or the prevention of the crippling effects of mental illness. The enthusiasm and excitement expressed by the authors is carried through in the discussions following each paper.

ROBERT J. WEISS

TUBERCULOSIS IN WHITE AND NEGRO CHILDREN—By Jeanette B. Hardy and Miriam Brailey. Cambridge, Mass.: Commonwealth Fund—Harvard University Press, 1958. Vol. I, 122 pp. Price, $7.50; Vol. II, 103 pp. Price, $4.50.

In 1928 Dr. Edward A. Park began a long-term study of the

course of tuberculosis at the Harriet Lane Tuberculosis Clinic in Baltimore. Admitted to the project were children under the age of two who were tuberculin-positive or who were in continuing contact with a sputum-positive adult in the home. Siblings with tuberculous infection and under the age of 15 were included in the study. Sixty per cent of all the included children were under five. New admissions to the study ceased after December, 1944, and the follow-up was terminated in 1950. Thus the study falls in the pre-antimicrobial era. The authors followed Dr. Park as directors of the study and in this work review in detail the methodology and results of the 22-year study. Remarkably few patients dropped out of the study; this bespeaks of an intensely devoted group of researchers and a cooperative and well motivated group of patients.

Volume I is devoted almost entirely to the reproduction of chest films of selected cases. The long period of observation produced serial films of great value in illustrating the complete course of primary tuberculous infection. A pithy introduction reviews the interpretation of chest films of children and a section on bronchoscopy and bronchography is appended.

Volume II, a masterly analysis of the epidemiology of primary tuberculosis, sets two questions: What is the prognosis of tuberculous infection?, and what is the risk of developing reinfection pulmonary tuberculosis? Tuberculin tests, chest films, bronchoscopy, bacterial test, autopsies (and, when necessary, hospitalization) were available and freely used. The life table method, thoroughly documented in the appendix, was a basic tool of the study.

Conspicuous were the differences between white and Negro children (two-thirds of the total). The latter showed more complications, many more overt clinical cases, and over twice the mortality rate. Metastatic lesions occurred most often during the first six months of known infection. Children infected before the third birthday, if dying of tuberculosis, died of disseminated disease, in 78 per cent; if infected after three years, the figure was 39 per cent. Only two white children later developed reinfection tuberculosis, but 32 Negro children did so, and the mortality was high (67 per cent).

This study, now published in full, is a classic in its field and should be in the library of every student of the epidemiology of tuberculosis. Each volume may be purchased separately.

EDWARD KUPKA

COMPARATIVE MORTALITY AMONG METROPOLITAN AREAS OF THE UNITED STATES, 1949–1951—Public Health Service Publication No. 562. Washington, D. C.: Gov. Ptg. Office, 1957. 143 pp. Price, $3.25.

This volume is divided into four sections. The first contains tables for each of 102 causes of death and for each of 163 metropolitan areas of the United States which show the ratio of the age-adjusted mortality rate of the white population of the area to the "expected" rate based on mortality in the whole country. Ratios for males and females are tabulated separately. In the second section frequency distributions of the ratios for each cause have been charted. The third and fourth sections summarize comparisons of mortality by cause among the areas classified according to degree of urbanization. The mortality rates refer to the population of 1950 and the deaths of 1949–1951 inclusive. Data on the populations and number of deaths employed in the calculations are included in the appendixes.

These statistics show that metropolitan areas differ measurably in terms of mortality according to cause and the magnitude and direction of the differences are often surprising. Comment has wisely been avoided on the point,

but it can be anticipated that reflection on these differences will stimulate inquiries aimed at explaining them, and that such inquiries will increase our understanding of the etiologic factors and medical care and public health problems involved in current mortality in this country. ANTONIO CIOCCO

IMMUNOLOGY AND CANCER—Edited by Otto v. St. Whitelock; Franklin N. Furness; Peter A. Sturgeon; and Jerome T. Syverton. New York, N. Y.: Annals of the New York Academy of Sciences (2 East 63rd St.), 1957. Vol. 69, Art. 4, pp. 525–856. Price, $5.00.

This symposium is the latest in a recent series on cancer research technics and interpretations published by the Academy. Characteristically, this one includes presentations by numerous well established investigators, many of whom have published the same material elsewhere.

The series as a whole, and this volume in particular, illustrates the very wide range of approaches and ideas in the problem of host-resistance to tumors and foreign tissues. Yet, although the book includes 26 formal papers and several discussions, prefaces, summaries, etc., it is far from a complete picture. The previous academy symposia on transplantation, leucocytic functions, ascites tumors, virus etiology of cancer, and cancer cytology provide an essential background for the present work.

The symposium is divided into sections on methods, results, and interpretations, but these are necessarily confluent in most of the papers. In most cases the emphasis is on refined applications of methods—varying from the familiar complications of complement-fixation to the newer trends in immunoelectrophoresis. The presentations vary from elementary statements of principles, as in the papers on the precipitin reaction and radioautography, to a very detailed discussion of the problems of physical separation of cell components.

Similarly, the papers on interpretations range from a simple statement of the theory of immunological tolerance in the newborn to a detailed presentation of data on the effects of cortisone and radiation. Adequate bibliographies are usually supplied to compensate for the more abbreviated papers. This is essential in some cases where the authors were required to present an almost hopelessly complicated subject in a brief time.

This, and the related symposia, constitute an important reference series for the cancer research worker.

B. A. RUBIN

DISASTER PROCEDURE MANUAL—Martinez, Calif.: Contra Costa County Health Department (Box 871), 1958. 100 pp.

When disaster strikes do you know what your job will be—or have you ever given it more than a passing thought? No matter how real or essential we may think preparation for a man-made catastrophic disaster of international origin may be there are reminders every day of the need to be prepared to meet the problems that result from the furies of nature and the frailties of men. Natural disasters of greater or less proportion are news every day—accidents from the simple fracture to widespread death and destruction are common occurrences.

The health department in one community—Contra Costa County (Calif.) decided that an ounce of preparation is worth many pounds in cure. Their "Disaster Procedure Manual" is a well thought out plan to ward off the panic, provide care for the needy, and protect the living should disaster strike their community. This concise, well written volume provides a detailed plan for each staff member with information on communications, assembly points, planned public announcements to fit numerous situations, and a good amount of technical information. All in all the manual pins down those thousands of detailed

decisions that must be made under urgent and trying circumstances if they are not made beforehand.

Not all of the value of this brochure is to be found in the staff planning portion; a good share of the publication (about three-fourths) is devoted to medical, nursing, and sanitation procedures to be followed. Radiological problems are considered in some detail although not at the expense of the more prosaic everyday health functions.

Like insurance, a disaster plan is essential in our modern world. As we move forward in the atomic age, already a decade and a half old, into the "sputnick" era it may become even more important. Like disaster insurance most of us will be far happier if we never collect on our policy.

WILLIAM H. CARY, JR.

ALCOHOL AND THE JEWS—By Charles R. Snyder. Monographs of the Yale Center of Alcohol Studies No. 1. Glencoe, Ill.: Free Press (1105 West Belmont Ave.), 1958. 219 pp. Price, $5.00.

This excellent monograph is the first of a new series on original research currently being reported by the Yale Center of Alcohol Studies. In it Dr. Snyder analyzes the sociocultural factors related to drinking patterns and sobriety among Jews. Some of the material, based on the author's doctoral dissertation, was originally published in the Quarterly Journal of Studies on Alcohol, but has undergone revision and is consolidated in this informative publication.

The study is based upon information obtained from two sources: interviews with a random sample of 73 New Haven, Conn., Jewish men; questionnaires administered to a sample of 644 male Jewish college students (as part of the College Drinking Survey by R. Straus and S. D. Bacon). The basic study design is sound and the sampling procedures and technics used in obtaining the data are discussed in detail, as well as the limitations inherent in the work.

Some popular concepts about drinking are carefully scrutinized. For example, the author's data show a higher incidence of drinking among Jewish than non-Jewish men. This finding is in sharp disagreement with a widely held idea that "Jews don't drink." Similarly, the ingroup-outgroup hypothesis often advanced is found to be an unsatisfactory explanation for Jewish sobriety. The author suggests, rather, that orthodox religious practices appear to be primarily responsible for the noteworthy sobriety of this group. Regional background, generation, and social class influence Jewish drinking patterns only to the extent that they affect retention or rejection or orthodox religious practices.

The chief value of this monograph lies in the leads for treatment which are implicit in the findings. It is refreshing to find a carefully done study which confirms some of our clinical impressions about the advantages of treating alcoholics in groups and in involving spouses and family members. This thought-provoking volume with its excellent bibliography and appended sample interview will be of particular value to those working with alcoholics or contemplating and undertaking research in this complex public health field.

ROBERT E. THOMAS

HOME CONDITIONS. A SOCIOMEDICAL STUDY OF 1066 HOSPITALIZED PATIENTS WITH SKIN AND VENEREAL DISEASES—By Esbern Lomholt. Copenhagen, Denmark: Rosenkilde and Bagger (3, Kron-Prinsens-Gade), 1958. 100 pp. Price, Dan.kr.14.00.

This little monograph, only 56 pages without the tables and bibliography, points out the difficulties inherent in the search for social causation of disease. The author studied 1,066 patients with skin and venereal disease admitted to his clinic at Marselisborg Hospital, University of Aarhus, Denmark, in the hope of finding through a meticulous and ex-

tensive interview some relationship between types of dermatological conditions and varieties of social pathology. Only two significant relationships appeared: atopic dermatitis was more common in children from unbroken homes and leg ulcers occurred with the greatest frequency in women from the lower social classes.

Curious about the incidence of broken homes, alcoholism, and poverty in his sample, the author turned to other cross-sectional studies for comparison. He also made what comparisons were possible with the published data for Aarhus. Somewhat to his surprise he discovered that his patients represented an ordinary cross-section of the general population. His dismay at finding such a prevalence of social pathology is epitomized in his statement: "Marriages without some sort of difficulties do not exist; if the father is not querulous, the mother may be hysterical."

Nevertheless, the findings reported are valuable for anyone concerned with human behavior. The normal prevalence of various disorders in a population must be discovered before a distinction may be made between "endemic" and "epidemic," aside from identifying causal relationships. One might wish that Professor Lomholt had gone into greater detail concerning his methods and his criteria, but what is given is a provocative contribution to a difficult field of investigation.

GEORGE G. READER

THE NEW FRONTIERS OF AGING—Edited by Wilma Donahue and Clark Tibbitts. Ann Arbor, Mich.: University of Michigan Press, 1957. 209 pp. Price, $5.00.

The Eighth Conference on Aging of the University of Michigan, held in 1955, was entitled "Aging—Applying Today's Knowledge." One phase of the conference was a research symposium at which some twenty-five scientists and health workers pooled their knowledge in order to identify unanswered questions in the field of aging and to see what concepts and principles may be applied. This book is largely devoted to a report of the symposium. Among the problems considered are the possible effects of automation on the length of work life, employment outlooks for older workers, ways of meeting the health needs of the aging, personal and social adjustment in old age, and the problems of retirement and the like. The answers offered by the participants in the symposium represent advances into the future and should be of interest to all public health workers.

GEORGE ROSEN

INDUSTRIAL MEDICINE IN WESTERN PENNSYLVANIA 1850–1950—By T. Lyle Hazlett and William W. Hummel. Pittsburgh, Pa.: University of Pittsburgh Press, 1958. 301 pp. Price, $6.00.

This book is one of a series dealing with the cultural history of western Pennsylvania. Since the major industries of that area are coal mining and steel manufacture, it is natural that these industries and their health problems should be discussed at some length.

The early concern with first aid and the treatment of injuries, characteristic of industrial medicine generally and the later development of emphasis on preventive medicine was found in western Pennsylvania as elsewhere. The local leaders in both these phases, and their contributions, are fully described. Many of the personalities mentioned are of purely local interest, but a few achieved national recognition.

No section of the country can develop in complete isolation. Its activities must influence and be influenced by activities elsewhere. Such interrelationships are woven into the account of industrial medicine in western Pennsylvania. Thus, while the book deals primarily with a relatively small part of the nation it will be of interest to all students of medical history, particularly those con-

cerned with the history of industrial medicine.

One subject which might have received more detailed discussion is the "check-off" system used in paying for medical services in mining towns. This interesting and significant method of prepayment for medical care receives only passing mention.

LEONARD J. GOLDWATER

SOCIAL CLASS AND MENTAL ILLNESS: A COMMUNITY STUDY—By August B. Hollingshead and Frederick C. Redlich. New York, N. Y.: John Wiley (440 Fourth Ave.), 1958. 442 pp. Price, $7.50.

This book is a product of 10 years of research in the community of New Haven, Conn. It stands now as the first major point of reference for further serious research in the relatively new and uncertain, but rapidly growing field of social psychiatry.

A result of an interdisciplinary effort headed by a sociologist, Hollingshead, and a psychiatrist, Redlich, its relevance is wider than these and closely allied fields. As its authors state, it should be of interest to a wide variety of persons concerned with public policy in health and welfare. Indeed, it has much to say to the ordinary taxpayer who is willing to dig for it.

By comparing the population of patients (persons in treatment with a psychiatrist or under the care of a psychiatric clinic or mental hospital between May 31 and December 1, 1950) with "controls" consisting of all persons in a five per cent systematic sample of households in the community, the authors are able to show strong relationships between class and (1) prevalence of mental disorder, (2) gross psychotic versus neurotic types of mental disorder, (3) subclassifications within both neurotic and psychotic types. Using just the patient group alone, they are able to show even stronger relations between class and sources of referral, types of agencies giving treatment, types of treatment, and direct costs of treatment. In short, they have traced, with remarkable perseverance and ingenuity, a common thread through many facets of mental illness—their relation to social class.

There are, however, general difficulties inherent in the design these authors have used. The largest of these, in my opinion, are three: First, there is the unsolved dilemma of the extent to which class relates to different degrees and types of mental illness as against differential, class-based perceptions of mental illness by psychiatrists and the many others influencing who gets treated, where, and in what manner. Second, the study is cross-sectional, and was conducted at one point in time; hence, the assumption that class is an antecedent factor of etiological significance in mental illness is a difficult one to demonstrate. Third, as the authors emphasize, the study deals only with treated mental disorder; the problem of how to assess untreated mental disorder is not solved here, although some intriguing suggestions are offered.

There are also difficulties that do not inhere in the design itself. Most notable of these to me is the fact that, in statistically controlling sex, age, race (Negro versus white), marital status, and religious affiliation (Catholic, Protestant, and Jewish) as possible "confounding" factors in relations between class and mental disorder, the authors omit nationality. Yet ethnic origins are singled out as salient features of social stratification in an excellent descriptive chapter on the class structure. I wonder also how replicable their index of class will be. It is based in large part on qualitative judgments by the sociologists on the study as these are applied to the community and persons within it. What they have done is, in a way, analogous to the use of clinical judgment in diagnosing mental disorders of individuals. In both cases the theory and operations

involved are far from explicit. Perhaps less important, there is occasional error of detail in either table or text describing table, as the two at times do not coincide; this last problem is most pronounced in the chapters on "Class and Prevalence of Disorders," and "Class Position and Types of Mental Illness." There may also be some question about the use of the population total rather than the sample total in chi-square comparisons of patient group and population. Finally, it would have been helpful, if the schedule administered to the community sample had, like the psychiatric census schedule, been included in an appendix. Presence of the schedule would help one evaluate assertions made in the descriptive chapter on class as to class-related social and cultural characteristics of the various strata. It would also be an aid to future research.

These are small points, however, when set against the scope of the challenge that this book presents. Consider as examples, only these few of the issues raised:

". . . validated knowledge in psychiatry is inadequate to meet the challenge presented by the size of the mental health problem.

"To help persons of all classes, psychiatrists will have to learn about the way of life of patients of all classes and ethnic groups. Before they can do this, psychiatrists will have to face some of their professional biases, just as the analyst in training learns to face unconscious and irrational personal sentiments through analytic scrutiny.

"Why should we not train a new professional specialist? . . . Possibly, out of the professions of medicine, social work, psychology, and sociology, a new discipline providing us with the needed therapists might emerge."

BRUCE P. DOHRENWEND

BOOKS RECEIVED

Listing in this column acknowledges the receipt of books and our appreciation to the senders. Space and the interests of readers will permit review of some, but not all, of the books listed.

AGGRESSION. John Paul Scott. Chicago, Ill.: University of Chicago Press, 1958. 149 pp. Price, $3.75.

BASIC CLINICAL PARASITOLOGY. David L. Belding. New York: Appleton-Century-Crofts, 1958. 477 pp. Price, $9.00.

COLD INJURY, GROUND TYPE IN WORLD WAR II. Tom F. Whayne and Michael E. DeBakey. Washington, D. C.: Gov. Ptg. Office, 1958. 570 pp. Price, $6.25.

COMMUNICATION IN MANAGEMENT. Charles E. Redfield (rev. ed.). Chicago, Ill.: University of Chicago Press, 1958. 314 pp. Price, $5.00.

DOCTORS' OFFICES IN HOSPITAL-FINANCED BUILDING. A Study of Hospital Expansion into Commercial Enterprise, and of the Effects Upon Physicians, Patients and Private Business. Chicago, Ill.: The Foundation for Management Research, 1958. 40 pp.

EDUCATION OF THE CLINICAL SPECIALIST IN PSYCHIATRIC NURSING. Report of a National Working Conference at Williamsburg, Va., November 26–30, 1956. New York: National League for Nursing, 1958. 80 pp. Price, $1.50.

ENVIRONMENTAL SANITATION. Joseph A. Salvato, Jr. New York: Wiley, 1958. 660 pp. Price, $12.00.

GENETIC CONCEPT FOR THE ORIGIN OF CANCER. Vol. 71, Art. 6, New York Academy of Sciences. Leonell C. Strong, et al. New York: The Academy, 1958, pp. 807–1241. Price, $5.00.

GUINEA PIG IN RESEARCH. Biology-Nutrition-Physiology: Mary Elizabeth Reid. Washington, D. C.: Human Factors Research Bureau, 1958. 87 pp. Price, $2.00.

HEARING THERAPY FOR CHILDREN. Alice Streng, et al. (2nd rev. ed.). New York: Grune and Stratton, 1958. 353 pp. Price, $6.75.

HOUSING CODES—THE KEY TO HOUSING CONSERVATION:
Vol. 1—Code Enforcement Problems and Recommendations
Vol. 2—Minimum Housing Standards Ordinance
Vol. 3—Administrative Guide for Local Programs
New York, N. Y.: Bureau of Community Development, State Division of Housing (270 Broadway), 1958. Limited Distribution.

INSECTICIDE RESISTANCE IN ARTHROPODS. A.W.A. Brown. (WHO Publication). New York: Columbia University Press, 1958. 240 pp. Price, $5.00.

INTRODUCTION TO PSYCHIATRIC NURSING. Marion E. Kalkman (2nd ed.). New York: McGraw-Hill, 1958. 331 pp. Price, $5.95.

MARTY MANN'S NEW PRIMER ON ALCOHOLISM. New York: Rinehart, 1958. 238 pp. Price, $2.95.

NEGROES AND MEDICINE. Dietrich C. Reitzes. Cambridge, Mass.: Harvard University Press for the Commonwealth Fund, 1958. 400 pp. Price, $7.00.

PROGRESS IN MEDICAL VIROLOGY. Vol. 1. E. Berger and J. L. Melnick. New York: Hafner, 1958. 304 pp. Price, $11.50.

PUBLIC HEALTH AND WELFARE—The Citizens' Responsibility. Selected Papers of Homer Folks. Edited by Savel Zimand. New York: Macmillan, 1958. 475 pp. Price, $7.00.

PUBLICATIONS OF THE WORLD HEALTH ORGANIZATION 1947–1957—A Bibliography. WHO Publication. New York: Columbia University Press, 1958. 126 pp. Price, $3.25.

REVOLVING DOOR—A Study of the Chronic Police Case Inebriate. David J. Pittman and C. Wayne Gordon. Glencoe, Ill.: Free Press, 1958. 154 pp. Price, $4.00.

SIMPLE METHODS OF CONTRACEPTION. An Assessment of Their Medical, Moral and Social Implications. New York: Planned Parenthood Federation of America, 1958. 64 pp.

SKEPTICAL PSYCHOANALYST, A. Kenneth Mark Colby. New York: Ronald Press, 1958. 145 pp. Price, $3.75.

SURGICAL CONVALESCENCE. F. Curtin Dohan, et al. Annals of the New York Academy of Sciences Vol. 73, Art. 2. New York: The Academy, 1958. 381–538 pp.

SURVEY OF HEALTH SERVICES AND FACILITIES IN THE CANAL ZONE, A. I. S. Falk. Canal Zone, U.S.A.: Health Bureau, 1958. 264 pp. Free.

TO WORK IN THE VINEYARD OF SURGERY. The Reminiscences of J. Collins Warren 1842–1927. Edited by Edward C. Churchill. Cambridge, Mass.: Harvard University Press, 1958. 288 pp. Price, $6.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Raymond S. Patterson, Ph.D., F.A.P.H.A.

Let the People Know—Both unmistakingly clear and strikingly useful is this chart showing the remarkable change in proportionate causes of death during the first half of our century. In 1901 chronic and acute diseases were about equal as causes of death (both being about 40-plus per cent, the remainder being by violence or unclassified conditions). In 1955 the percentages were about 81 (chronic) and 10 (acute). The chart is the sort of thing one might well preserve in his clipping file for use when the need arises.

ANON. The Increasing Dominance of Chronic Disease. Statist. Bull. Metrop. Life Insur. Co. 39, 8:8 (Aug.), 1958.

Proud Record—For half a century the (Br.) Medical Officer has been reporting and commenting upon the principles and practices of public health throughout Great Britain. The story is both entertaining and revealing and the record is one that cannot help but be of great interest to us, too. Just one chief editor guided this weekly journal's destinies through all but four years of the half century, which must be a record.

ANON. A Chronicle of British Public Health. M. Officer 100, 10:153 (Sept. 5), 1958.

Lest You Forget—Among the deceased (veteran) policyholders of government life insurance the death rate for smokers (when adjusted for age distribution) was 32 per cent higher than that of non-smokers. Lung cancer rate for regular smokers of cigarettes was 10 times that of nonsmokers—and for coronary disease, the rate was 63 per cent higher. Listed are more statistical findings worth keeping in mind.

ANON. Smoking Mortality Rate Among Veterans. Pub. Health Rep. 73, 8:714 (Aug.), 1958.

Crimes of Dullness—Those of us who may be prospective (or hopeful) essayists—and who of us isn't—would do well to take to heart what this caustic-minded (British) physician has to say about medical writing and medical journalism. Much of it had been said before, but he says it better. About brevity, the author says, "medical articles should like after-dinner speeches, finish before the audience's interest has started to wane." Anyone can substitute the word "health" for "medical" to excellent effect.

ASHER, R. Why Are Medical Journals So Dull? Brit. M. J. 5094:502 (Aug. 28), 1958.

Happier Nursing Homes—A conference (to be held annually hereafter) of about 150 persons concerned with nursing home supervision set these goals for its deliberations: (1) to determine essentials of service; (2) to clear the ways in which accrediting, standard setting and regulation might improve quality of care for the chronically ill and aged; (3) to encourage realistic attitudes toward financing facilities and services; (4) to provide for public, professional and patient education; and (5) to explore ways to provide consultative and assistance services. Three of the addresses along these lines are summarized.

ANON. Nursing Home Goals. Pub. Health Rep. 73, 8:699 (Aug.), 1958.

In Canada Now—Hospital insurance, as carried on there, is a joint federal-provincial affair and the program differs in detail from province to province, as each may elect. In general, two systems are at work; either a premium system (a sort of poll tax) or a general tax (usually a sales tax). When local public health and hospital services combine, collaborative benefits accrue to both, says the author of an accompanying paper.

CAMERON, G. D. W. The Hospital Insurance Pattern in Canada, (and) CHARRON, K. C. Public Health and the Hospital Insurance and Diagnostic Services Program. Canad. J. Pub. Health 49, 8:317 (Aug.), 1958.

That Old Adam—In a recent (Br.) public opinion polling "only 3 people in a hundred were not aware that such a relationship (smoking a possible cause of lung cancer) had been asserted." The reporters conclude: "the problem is not so much one of knowledge as of conviction and action, and our findings demolish once again, the fallacy of the Socratic assumption that underlies much health education." They discuss what motivational research may be necessary if we are ever to induce prospective smokers to avoid cigarettes.

CARTRIGHT, A., AND MARTIN, F. M. Some Popular Beliefs Concerning the Cause of Cancer. Brit. M. J. 5096:592 (Sept. 6), 1958.

Transmitted Polio Immunity—Of the pregnant women in this study, 33 per cent were found to have some immunity to all three types of poliomyelitis virus. After two injections of Salk vaccine 82 per cent showed measurable antibody to all three types. Their infants had essentially the same antibody levels at birth but lost half the protection in about five weeks. After two injections, at one year or less, 32 per cent of the infants had measurable amounts of antibody still, but less than that of their mothers.

DaSilva, M. M., et al. Response of Pregnant Women and Their Infants to Poliomyelitis Vaccine. J.A.M.A. 168, 1:1 (Sept. 6), 1958.

Contaminated Food and Drink—Food- or water-borne outbreaks of disease continued during 1957 at about their usual rates of frequency though there were very few recorded waterborne outbreaks and none charged against market milk. Among the minor epidemics there were some weird and wonderful breaks in our vaunted sanitary safeguards. All in all, this latest of the annual tabulations leaves us little, as guardians of the public's health, about which to congratulate ourselves.

Dauer, C. C. 1957 Summary of Disease Outbreaks. Pub. Health Rep. 73, 8:621 (Aug.), 1958.

Is This Public Health?—In Oklahoma City conference teams—physician, attorney, minister, financial expert, and secretary—hear a husband and wife air their marital discords, always in each other's presence. The reasons for this unique, but allegedly highly successful, method of marriage counseling are discussed. And if you want more information about the project than the paper gives you, then you can get it for the asking.

Dersch, W. H., et al. A Clinical Method for the Solution of Family Problems. GP 18, 3:75 (Sept.), 1958.

Just Good Business—A state rehabilitation agency returned to professional life 35 laboratory technologists, 26 nurses, and 17 physicians, among others. The cost of their rehabilitation as compared to their anticipated lifetime tax returns to the government was something in the nature of one to 60. To this return in cold cash may be added the benefit of otherwise wasted recruits to professions that are in short supply, and the avoidance of continuing assistance to the disabled aged the rehabilitated would have become.

Felton, J. S. Production of Medical Personnel Through Vocational Rehabilitation. J.A.M.A. 167, 16:1905 (Aug. 16), 1958.

Unhealthy Heat—"An excess mortality regularly accompanies periods of unusually high summer temperatures in the United States." What does this observation really mean in terms of human health? What do we actually know about the effects of temperatures on mortality? A review of the many, many articles on this topic leads to the conclusion that we do not know nearly as much as we ought. This leads to a stimulating discussion of what might be attempted to shed more light on this still dark subject.

Gordon, J. E., and Erhardt, C. L. Weather and Death. Am. J. M. Sc. 236, 3:383 (Sept.), 1958.

Business Executive Speaks—How is water fluoridation getting on in your town? If your efforts are still being hamstrung by a noisy opposition, then you may want a supply of this refreshingly reasonable contribution to the campaign literature of this subject. It is by the president of the (New York City) Better Business Bureau. Reprints are available from the ADA's Bureau of Public Information.

Jackson, H. R. A Layman Looks at Fluoridation. J. Am. Dent. A. 57, 3:353 (Sept.), 1958.

Helping the Sore Beset—Usually the first on the scene, and often the only

person the patient beset by emotional problems will confide in is the public health nurse. How well can she—and the agency she works for—meet the emotional needs as well as the nursing needs of such patients? A good nurse, says the author, gives emotional support while giving educational information while she gives direct nursing care. As she will do it any way it behooves us to see that she does all three well. (In succeeding issues of this magazine, a psychiatrist and a mental health consultant will tell what one association is doing to help its nurses in this matter.)

MORROW, J. T. Mental Health—the Visiting Nurse Program. Nursing Outlook 6, 9:505 (Sept.), 1958.

Facts Instead of Hearsay—Seven oriental countries were visited to see if there was any foundation for the assumption that orientals are immune to atherosclerosis and hypertension, and if cardiovascular disorders do exist, to find out if there is any epidemiologic evidence of causal relationship between dietary fat and such disorders. In the fewest possible words: the finding of this thorough study is that there are plenty of cardiovascular disorders and there is no clear evidence of a relationship to dietary fat.

SCHROEDER, H. A. Degenerative Cardiovascular Disease in the Orient (two papers). J. Chronic Dis. 8, 3:287 (Sept.), 1958.

They Need to Know—The browsing reader will be struck, in this report upon maternal and child health matters, by the huge proportions of new mothers who were quite unaware that classes for parents or visiting nurse services were available to them. There are, of course, many findings of immediate interest to maternal and child health readers who will probably agree that "there is more need for maternal and child health nursing services now than at any time since the early part of the century."

YANKAUER, A., et al. How Much Do Parents Need and Use Public Health Nursing Services? Nursing Outlook 6, 9:508 (Sept.), 1958.

If additional information is desired regarding the articles listed in this bibliography, please communicate directly with the publications in which they appeared; the addresses are furnished for your convenience.

Am. J. M. Sc. (American Journal of the Medical Sciences), Lea & Fegiber, 600 Washington Square, Philadelphia, Pa.

Brit. M. J. (British Medical Journal), British Medical Association House, 19 Tavistock Sq., London, W.C.1, England.

Canad. J. Pub. Health (Canadian Journal of Public Health), 150 College St., Toronto 5, Canada.

GP (American Academy of General Practice), Volker Boulevard, Brookside, Kansas City 12, Mo.

J. Am. Dent. A. (Journal of the American Dental Association), 222 E. Superior St., Chicago, Ill.

J.A.M.A. (Journal of the American Medical Association), 535 N. Dearborn St., Chicago, Ill.

J. Chronic Dis. (Journal of Chronic Diseases), C. V. Mosby Co., 3207 Washington Boulevard, St. Louis, Mo.

M. Officer (Medical Officer), Chronicle House, 72–78 Fleet St., London, E.C.4, England.

Nursing Outlook, American Journal of Nursing Company, 2 Park Ave., New York 16, N. Y.

Pub. Health Rep. (Public Health Reports), Gov. Ptg. Office, Washington, D. C.

Statist. Bull. Metrop. Life Insur. Co. (Statistical Bulletin Metropolitan Life Insurance Company), One Madison Avenue, New York 10, N. Y.

CREDIT LINES

The Journal cannot furnish copies of items mentioned in Credit Lines. Please send requests to the addresses given.

AMA Has a Newspaper

AMA News is the American Medical Association's biweekly newspaper "designed to fill the doctor's need for news of the medical community." Its first issue (September 22, 1958) says, "It is edited in easy-to-read style. . . . Editorial content will be non-technical, featuring articles of special interest to doctors in the medico-economic and socio-economic fields. It will reflect all aspects of a physician's life, his work, his problems . . . medicine's greatest conduit of information."

Jim Reed is the editor of AMA News, 535 North Dearborn St., Chicago 10, Ill.; $3.50 annual subscription.

Health and Vital Statistics

The Public Health Service has developed "a convenient source of information to answer questions often asked with reference to health and vital statistics in the United States." This is PHS publication No. 600, "Summary of Health and Vital Statistics," in 28 pages of tables and charts.

Aside from serving as a convenient source of information the material is a thrilling capsule story of what has been happening to human beings in the United States in the last half century. For example, between 1930 and 1957 numbers of 15–19-year-olds have barely held their own, the 20–24-year-olds have decreased by 5 per cent while the one-year-olds have increased by nearly three-quarters, the one-to-four-year-olds by two-thirds, those 45 and over 78 per cent and of these the oldsters of 65 and over have more than doubled in number in a quarter of a century. What this means in health, educational and social problems and phenomena is panoramic. Similarly, practically every table and chart reduces to kaleidoscopic view a vast history of change and progress and regress. Public Health Service, National Office of Vital Statistics, Washington 25, D. C. Free.

New Hampshire's Bulletin

With a summer issue of four pages the "Graniteer" of the New Hampshire State Department of Health made its debut. This is designed as a quarterly. It includes the reports from physicians of communicable diseases county by county. The first issue describes the work of the public health nurse—"Messenger of Health." State Health Department Building, Concord, N. H.

Complexity of Juvenile Deliquency

If you really want to know in their own words how juvenile delinquents started on that road and the pressures that lead them to murder—often—read CBS radio transcript of "Who Killed Michael Farmer?" This is the full transcript of a one-hour broadcast narrated by Edward R. Murrow in which some of the gang who killed Michael Farmer took part, as well as some of the parents, children's court worker and psychiatrist, policeman, parole worker. The inevitable conclusion that must be drawn is that these youths are as much sinned against as sinning.

The transcript has been reproduced by the Ross Laboratories in its "Developments in Infant and Child Care" series.

This series is a newsletter for science writers and editors. "Who Killed

Michael Farmer?" is No. 9, July–August 1959, Medical Department, Ross Laboratories, Columbus 16, Ohio.

Understanding Tensions—Humorously

"The Worry-Go-Round" and "Needlepoints" are attractive booklets helping men and women respectively to understand how they build up the tensions that decrease their effectiveness and shorten their lives. They are illustrated with humorous cartoons right out of a busy every-day life in which the hobgoblin is Hi-tension. The text fits the mood.

The Connecticut Mutual Life Insurance Company (Hartford, Conn.) which publishes them disclaims any "easy cure-all," but suggests that understanding is the beginning of cure. The booklets are for free.

Story of a Home Care Program

"Rehabilitation and Palliation" is the title of the report of the 1956–1958 operation of the San Francisco Home Care Program. This has been a two-year demonstration, the continuance and growth of which depends upon finding new sources of revenue. The report says that "a closely knit staff is dedicated to the proposition that Home Care, which has been tried and not found wanting in 70 other programs in the United States, is an important and necessary step forward in San Francisco health plans."

In the two-year period more than half of the 184 patients referred were accepted and nearly two-thirds of these had been discharged. During the two years the 108 patients had received nearly 17,000 days of home care and 1,200 days of hospital care, or in the ratio one hospital day to 14 days of home care.

In an analysis of monthly costs per patient for 49 patients in eight diagnostic categories, the average ranged from $115 for orthopedic patients to $282 for California Veterans Administration patients. In all but two instances physician services were the largest single item of cost; in neurological cases, social worker services loomed largest; in VA cases, housekeeping services cost nearly five times as much as in the next largest category for this service. The smallness of the numbers upon which the averages are based must, however, be remembered in studying or using the figures.

The home care program is administered by a voluntary agency with the advice of an advisory council, made up of a chairman and representatives of 17 agencies including the city health and welfare departments, Blue Cross, the university hospital, VNA, Community Chest, rehabilitation agencies, labor union, insurance company, and others. The staff includes an administrator, a medical director, home care physicians, social workers, both a general and a nursing coordinator, physical and occupational therapists, and research associates.

The administrator is Mark Berke, San Francisco. No information as to cost or distribution of the report.

Health Departments and Home Safety

"Home Safety Project" is the final report of a four-year project of the California State Health Department carried out under a grant from the W. K. Kellogg Foundation. It contains among many things a philosophy of home accident prevention, reports of research studies made in the course of the study, suggested ways to collect and classify information about accidents, and plans for local and state programs. The application of epidemiological principles to home accident prevention is basic to the philosophy of the project. There is a final meaty page of summary in the 170-page volume.

Distribution, says the report, must necessarily be limited to those planning

or actively participating in accident prevention programs, California Department of Public Health, 2151 Berkeley Way, Berkeley 4.

A Half Century of Vital Statistics

Basic Vital Statistics, New York State, 1900–1957, as revised in 1957, is a microcosm of what has been happening in the lives of people in the United States in the last half century. The story of population and its age distribution, of marriages, births, deaths and their causes, tell a story of social and economic changes of public health and medical progress, and particularly of health education progress.

For example, the total accidental death rate has been almost halved since 1909; the same is true of the home accident death since 1939, while the motor vehicle accident death rate for the same period has decreased by one-third. The cancer death rate has nearly tripled since the turn of the century with the largest increase in cancer of the respiratory system, the rate for which increased nearly five times since 1931. The live birth rate for 1957 is almost identical with that of 1900 but was one-third lower during several of the years between.

The retiring director of the Office of Vital Statistics, J. V. DePorte, Ph.D., offers readers copies without charge. New York State Department of Health, 84 Holland Avenue, Albany 8, N. Y.

For Physically Handicapped Mothers

The Home Economics Research Center has developed a rehabilitation film entitled "Child Care Problems of Physically Handicapped Mothers." The 16mm 30-minute color film is designed to orient professional personnel and lay persons to the problems of handicapped mothers in caring for young children. It presents how difficulties may be handled. Eight different homes were used in building the film, one of a normal mother, three wheelchair mothers and one an amputee, one with muscular weakness, and one each using a crutch, and leg braces. The film also points up the need to expand rehabilitation programs for a much larger number of the estimated 10 million handicapped homemakers in the country.

The film may be borrowed for $1 to cover handling charges. Purchase price on request Audio Visual Center, University of Connecticut, Storrs.

The Research Center at the university also has teaching materials available particularly on self-help clothing for preschool children.

Migratory Labor Notes

The increasing public health implications of and attention to migrant labor is indicated by "Migratory Labor Notes" of the President's Committee on Migratory Labor, now in its fifth issue. There were two in 1955, one in 1956 and two so far in 1958, April 1 and May 15. When the notes were begun only seven states had migratory labor committees. Currently there are such committees in 17 states—and others forming—"enough to warrant publication on a more frequent basis."

It is designed as a "medium for describing what is being done at all levels of government, and by many private organizations for the agricultural migrant worker and his family." This material should be in the hands of state and local health departments that have or should have responsibility for the health of migrant laborers in their areas.

The President's committee is made up of the secretaries of agriculture, interior, labor, health, education, and welfare, and the administrator of the Housing and Home Finance Agency and a working group from each department, including Katherine Bain, M.D., deputy chief

of the Children's Bureau, and Donald Harting, M.D., chief of the Program Development Branch, Public Health Service.

The U. S. Department of Labor has long had concern with the employment of migrants. This concern too is being expanded as indicated in "Progress in Housing for Migratory Farm Workers." This describes good migratory housing projects in a number of states—Arizona, California, Oregon, Idaho, Florida, Wisconsin. There is also a digest of the New Jersey migrant labor code and a Wyoming poster of information for the worker with special reference to the use of his temporary home.

The Public Health Service gets into the act with its June, 1958, Agricultural Migrant Reference List. This lists and describes 32 printed materials and two visual aid items that are available in limited numbers from the Service. Program Development Branch, Bureau of State Services, Public Health Service, Washington, D. C.

Worth Acquiring

"Programs on Alcoholism Research, Treatment, and Rehabilitation in the United States and Canada" reports the result of a survey, the fifth in an annual series of public financed alcoholism programs. What is going on in the 39 states that have programs and under what departmental auspices should serve for comparison and stimulus among agencies operating or planning alcoholism programs.

Of the 39 state programs, 14 are operated by special independent commissions, 25 are operated as an integral part of existing health, mental health, or welfare agencies. Of the 39 agencies, nine were either in process of organization or no funds had been allocated. At the end of 1957 more than $25 million had been available in all states since the inception of the programs. With figures missing for five states and no allocations in two, the total 1958 appropriations in the remaining 32 totaled nearly $5,650,000. California with nearly three-quarters of a million dollars, had the largest appropriation; Florida followed with more than half a million; Connecticut, Massachusetts, Minnesota, and Virginia, in that order, each had appropriations of more than $300,000.

The Licensed Beverage Industries prepares this annual report. 155 E. 44th St., New York 17, N. Y. Free.

Annual Report

Quadrennial Report: 1954–1957 is both the four-year and the 1957 report of the Pan American Sanitary Bureau, also the regional office of WHO. It is a handsomely printed and illustrated volume of some 240 pages. In his review the director, Fred L. Soper, M.D., puts emphasis upon "an effective alliance between the various international health agencies . . . and the coordination of national health programs in regional and global efforts." . . . "The expanding concept of eradication" of disease and its implications for "the economic, social cultural and health conditions of the world" also engages Dr. Soper's attention. The three basic subjects of the report are communicable diseases, public health administration, and education and training.

Pan American Sanitary Bureau, 1501 New Hampshire Ave., Washington, D. C.

NEWS FROM THE FIELD

WHO News

Virologists Visit United States

Eight WHO fellows from as many countries and representing four of WHO's six regions are on a nine-week visit to the United States and Canada. The virologists are studying "Polio Diagnostic Techniques and Vaccine Production and Control."

After briefing and discussion at the Pan American Sanitary Bureau, the itinerary includes training and observation at the Communicable Disease Center Laboratories in Montgomery and Atlanta, the Institute of Microbiology Polio Laboratory in Montreal, and three pharmaceutical companies producing polio in Detroit and Indianapolis. They will study safety and potency testing of polio vaccine at the National Institutes of Health. An evaluation session with PASB will follow after which each will have an individual program during half of the total period.

Countries represented are Austria, Chile, Egypt, French Equatorial Africa, Lebanon, Poland, and the United States of Soviet Russia.

Dr. Horwitz Succeeds Dr. Soper

At the recent 15th Pan American Sanitary Conference, held in San Juan, September 21–October 6, Abraham Horwitz, M.D., M.P.H., was elected to succeed the retiring Fred L. Soper, M.D., as director of the Pan American Sanitary Bureau. He will take office on February 1, 1959. The name of Dr. Horwitz will be presented also to the Executive Board of WHO for appointment since PASB serves as the Regional Office of WHO for the Americas. He is currently assistant director of the National Health Service of Chile, his native country, and is on leave from his position as director, School of Public Health, University of Chile. He had earlier been chief of the Professional Education Branch in the Washington Office of PASB.

Dr. Soper on his retirement, January 31, 1959, will have completed 12 years as PASB director. During this time, the organization became the regional office for the Americas of WHO (March, 1959). During this period also the work of PASB has been decentralized with regional offices in Buenos Aires, Caracas, Guatemala, Lima, Mexico City, and Rio de Janiero. Among other developments in which PASB had a part during the period are the publication of the bilingual quarterly, "Estadistica Sanitaria," a new building for PASB in 1951, the creation of an Aftosa Center in Brazil to study hoof and mouth disease, the translation into both Spanish and Portuguese of "Control of Communicable Diseases in Man," the 50-year celebration in 1952 with the "First Pan American Health Congress," the growth of the Institute of Nutrition of Central America and Panama, and the small pox and malaria eradication programs.

Antirabies Fight in Latin America

A control of rabies program in five Latin American countries is being stepped up with the assistance of the Pan American Sanitary Bureau. Karl Habel, M.D., a virus research scientist and authority on rabies on the staff of the National Institutes of Health, is on a six week leave to serve as a staff member of PASB's Pan American Zoonoses Center. In this consultant capacity, he is visiting laboratories, health institutes, and departments and ministries of health in Brazil, Argentina, Chile, Peru and Panama, as well as the new NIH Research Virus Laboratory in the Canal Zone and the Zoonoses Center in Azul, Argentina.

Dr. Habel is a member of the WHO Expert Committee on Rabies. He is the originator of the Habel test for virus po-

tency which has had world-wide use for more than a decade.

PHS Research Grants in 1958

The story of Public Health Service, "Grants and Fellowships," awarded by the National Institutes of Health in 1958 is told in detail in a 312-page volume. A brief introduction describes the review process that precedes an award. First, a proposed project is carefully appraised by a Study Section of the Institutes, made up of a panel chiefly of nongovernment scientists in the general field of the project. It is then reviewed by the relevant National Advisory Council without whose recommendation the Surgeon General may not grant an award.

The extensive tabular material is classified into research facilities construction grants, research fellowships, and research project grants. Each is classified by state and institution. For the second, the name of the fellow and the department are added; for the third, the investigator, project title, and amount of award.

In summary, 177 awards, totaling $30,200,000, were made to 134 institutions for health research facilities construction. A total of 2,329 research fellowships in the amount of $6,431,000 were awarded to individuals in 211 institutions in 42 states, one territory, the District of Columbia, and 11 foreign countries. Awards of $99,481,000 were made for 7,028 research projects to persons in 699 institutions in 48 states, two territories, the District of Columbia, and 28 foreign countries—a grand total of $136,112,000.

PHS Publication No. 624. Government Printing Office, Washington 25, D. C., 75 cents.

Russian Medical Literature

The National Library of Medicine has published a "Guide to Russian Medical Literature" to facilitate searching in this literature. It is hoped that the handbook will help to remove two formidable barriers to a better understanding of Russian science; the language barrier and unfamiliarity with the published systematic approaches to Russian works. There are separate chapters on Western and Russian language sources, on Russian literature in translation, on obtaining Russian medical literature, together with a selected list of titles. A bibliography in translation, a description both of medical libraries and the medical press in the USSR, complete the work.

PHS Publication No. 602, Government Printing Office, Washington 25, D. C., 40 cents.

Kellogg's Variety of Support

Among its far flung interests, the W. K. Kellogg Foundation is helping Michigan communities to find dentists—a three-year grant of $18,000 to the Michigan Health Council to carry on a program for placing new dental practitioners in communities that need them. The Council already has an "M.D. Placement Service" and will follow much the same plan in its "DDS Placement Service." In the former service, 276 physicians have been placed, largely in small or semirural communities that have had difficulty in obtaining enough doctors to meet the needs of the people. It is estimated, on the basis of a questionnaire, that some 500 communities in the state are in need of dentists at the same time.

A continent away the Foundation has helped to finance a second overseas continuation education center. It has appropriated funds to build a lecture, demonstration, and reception hall for the Edinburgh Centre of Rural Economy. Here the Foundation is helping to develop a concept of continuing education such as it is supporting in several universities in the United States. Continuation centers are being supported in

Michigan State University and the University of Georgia and are projected at the Universities of Chicago and Nebraska. Included also among the centers that seek to extend to the people the resources and findings of current education and research is one of Ireland. All told, Kellogg has provided about nine million dollars for buildings and programs of continuation centers.

Also recently announced is a second five-year grant to the Federation of Young Farmers Clubs of England and Wales, chiefly to continue the international farm youth exchange activities through which exchange visits are arranged with several countries, including the United States. Fourteen of these young people recently arrived in the United States for study, travel, and observation during periods of from six to twelve months. They are studying at seven universities in six states and at the Department of Agriculture.

Still in the agricultural area, a three-year commitment has been made to the Agricultural Research Council of Norway to help in providing a new building and equipment for the Institute of Agricultural Engineering. The Kellogg Foundation is already financing fellowships for advanced study and observation in the United States for "high-potential" personnel of agricultural agencies of Norway and for establishing a Division of Rural Sociology in Norway's Agricultural College.

Training Program Evaluated

A National Conference on Public Health Training called by the Public Health Service for three days, July 28–30, tried to chart the "most effective distribution of responsibilities between federal and state governments with respect to the administration and support of public health training." In this assay the effectiveness of the program carried on under Title I of the Health Amendments Act of 1956 was reviewed, together with desirable modifications needed in the basic legislation. Preconference study committees, working for six months, and on the basis of the general approach recommended by the Surgeon General's National Advisory Committee on Public Health Traineeships, prepared background material that was included in a source book for the conference.

The three study committees were a steering committee, headed by James K. Shafer, M.D., chief of general health services in the PHS Bureau of State Services; a committee on needs for public health training with Berwyn F. Mattison, M.D., executive secretary of the American Public Health Association, as its chairman; a committee on resources for public health training with Charles E. Smith, M.D., dean, University of California School of Public Health, chairing it. Much of the data assembled were obtained by questionnaire from both official and voluntary operating agencies, recipients of traineeships, employers of trainees, and training institutions. Returns were received from 86 per cent of over 1,300 queries sent.

Proceedings of this conference, with recommendations, are now in preparation. The conference found indication of a serious deficiency in the training of many currently employed personnel—over 20,000 professional workers in government and voluntary agency employ. Many needs in health and health related programs just over the horizon have either not been formulated or not completely developed by state and local health departments. Examples refer to health hazards incident to developing industrial technology and to radiation and health. It was estimated that there are currently 2,500 vacancies in professional categories in the health field due to lack of trained personnel. Further, 6,100 specialized trained professional workers will be needed in the next five years to meet the demands due to population growth and new health hazards.

Recommendations were made as to methods of administration of the training program, particularly increasing the available funds; on new areas of training that need attention such as the needs of teaching institutions, voluntary agencies, continuation education, and integration with other recruitment activities; the role of state governments and educational institutions; training methods in the Public Health Service; and evaluation and planning. As to the latter need, it was recommended that an evaluation conference be held at the close of each five years of the program.

When available, the proceedings of this meeting will constitute the basic public health traineeship blueprint for the immediate years ahead.

Research As an Economy

The New York City Health Research Council was inaugurated in a public ceremony on September 17. The Council will sponsor public and private research on medical problems. One of its aims is to "refresh and renew the membership of the scientific community" by attracting and developing youthful researchers "without whom that community will lose its vigor."

In announcing the new municipal program, Mayor Robert E. Wagner emphasized its importance as an investment rather than a spending program. For example, a quarter of a century ago diphtheria, killing 1,000 children a year, cost the community more than a million and a half dollars a year. Now there has not been a death for a number of years and immunization—the result of research—costs less than $200,000 a year. Thus more than a million dollars has been saved annually. He promised further that the Council's "policies will be guided by scientists wholly free of political and other pressures." For the first year $600,000 has been appropriated but it is the hope that eventually one dollar per capita of the city's population may be provided.

The program of this Research Council will be administered by a new Office of Health Research in the City Health Department. This office is being headed on a part-time basis by Colin MacLeod, M.D., professor of medical research, University of Pennsylvania, as secretary of the Council. Forty-seven members make up the Council of whom 15 are experts in health and medical research; two are Nobel Prize winners; four are Lasker Award winners; ten are members of the National Academy of Sciences. The chairman is Walsh McDermott, M.D., Cornell University Medical College.

Detailed Analysis of Accident Data

A publication of special interest to health departments, persons, and groups concerned with accident prevention is now available. "Accidental Injury Statistics," prepared by the PHS Accident Prevention Program, presents, through a series of charts and tables, the salient facts about injuries and deaths in the United States. Figures on incidence of nonfatal injuries, leading causes of death, trends in accidental deaths as recorded over a 50-year period, types of accidents, and relationship of accidents to marital status and place of residence are summarized.

The data indicate little change in the number of accidental deaths for the population as a whole throughout a 40-year period. Approximately 50 million persons per year are injured in accidents, 40 per cent of which occur in the home. About two-thirds of the home accidents take place inside the house, more than one-fifth of them in the kitchen. Other figures in the report demonstrate the staggering number of man-years lost through accidents, as well as the dreadful toll in the lives of youth. While death rates in age groups up to 35 due to such diseases as tuberculosis, influenza, pneu-

monia, typhoid fever, and heart ailments —all major killers in 1900—have shown a steady and dramatic decline, the rate of accidental deaths in this age group has remained relatively steady, claiming almost 35,000 lives in 1956.

The figures, which are shown by state, are based on National Health Survey data collected in sample household interviews, on statistics provided by the Office of Vital Statistics, and on information contained in several selected studies of accidental injuries.

The Accident Prevention Program plans to revise "Accidental Injury Statistics" annually or more frequently depending upon needs and will include new data as they become available.

Single copies free from Division of Special Health Services, Public Health Service, Washington 25, D. C.

Dr. Sabin Honored in Statuary Hall

A statue of the late Florence Rena Sabin, M.D., will be placed in the Statuary Hall of the Capitol Building in Washington, D. C. This will be the first of two statues representing Colorado in the hall. Five other physicians are honored in Statuary Hall; Marcus Whitman, who died in 1847, Washington; John McLoughlin, 1857, Oregon; John Gorrie, 1855, Florida; Crawford W. Long, 1878, Georgia; Ephriam McDonell, 1830, Kentucky.

Dr. Sabin received a Lasker Award of the American Public Health Association in 1951. Cited particularly was her leadership in modernizing public health in Colorado following retirement from a long career in research and earlier as a professor of histology. The Colorado Public Health Association also presents an annual award in her honor. Among many other awards she received during her lifetime are an Elizabeth Blackwell Citation of the New York Infirmary for Women and Children in 1953, the Trudeau Medal, and the Jane Addams Award.

Earns Right to Regulate Primatene

In a recent decision the Pennsylvania Court, in a case brought by Whitehall Laboratories against the State Health Department, held that the state's Dangerous Drug Act of 1955 was a valid exercise of the police power. The laboratories in question had argued that "Primatene" should be excepted from a health department regulation of 1956 requiring that Primatene as a dangerous drug could be sold only on prescription. The decision specifically upheld the secretary of health in not excepting Primatene from the regulations. The court further denied the contention that the U. S. Congress had preempted this field of regulation and thus precluded action by the state body.

PERSONALS

RUTH ABERNATHY, PH.D.,* former professor, Department of Physical Education, University of California, Los Angeles, has been appointed editorial adviser on health education and physical education, Lea and Febiger, publishers.

ELEONORA L. ALDRICH, R.N.,† is director, Visiting Nurse Service, Nashville, Tenn.

RUTH M. ANDERSON, R.N., is hospital nursing consultant, North Dakota State Health Department.

ARTHUR G. BAKER, M.D.,* former director, Allegheny County (Pa.) Department of Health, is now director of the newly established Lake County (Ill.) Department of Health, with offices in Waukegan.

RICHARD O. BALLEW, M.D., has been assigned by the Public Health Service to the Venereal Disease Control Section, South Carolina State Board of Health.

WILLIAM W. BLAISDELL, M.P.H.,† former training officer, Fellowships Branch, Pan American Sanitary Bureau, WHO Regional Office, is now chief, Health Education Section, District of Columbia Department of Public Health.

CHESTER S. BOWERS,* director, Bureau of Public Health Education, Connecticut State Department of Health, has been named vice-president and director of health information services, David Graham Hall Foundation, Dallas, Tex.

* Fellow.
† Member.

PATRICIA M. BRANDT, R.N.,† former assistant administrator, Children's Hospital of St. Louis, is now professor of nursing, University of Arkansas School of Nursing, Little Rock.

LAVERNE E. CAMPBELL, M.D., M.P.H.,† former health commissioner, Clinton County (N.Y.), now holds the same position in Genesee County, with offices in Batavia.

NAHAM C. CONS, D.D.S., M.P.H.,† is coordinator of dental hygiene services, Cincinnati Public Schools.

H. JACKSON DAVIS, M.D.,* director, Bucks County Department of Health, has resigned to become health commissioner of Troy-Rensselaer County, N. Y. He thus returns to the state in which he had previously held many state and local health administrative positions.

CAROLINE H. ELLEDGE,† is now chief consultant, public health social work, New York City Department of Health.

MILDRED ELSON, former executive director and recently consultant to the American Physical Therapy Association, has been appointed project coordinator, New York City Homestead studies on public home infirmary care, Hospital Research and Educational Trust.

HOWARD ENNES, M.P.H.,* has been awarded the Medialle d'Argent of the Pasteur Institute of Paris, for having put "notable value on the great Pasteur realizations" for his recent work with the International Union for Health Education of the Public and in creation of the American National Council for Health Education of the Public. Presentation was made in New York City in May by SECRETARY-GENERAL LUCIEN VIBOREL of the International Union for Health Education of the Public.

MOREY R. FIELDS, ED.D.,* director of public health education, New York City Department of Health, has received the annual award for medicine of the New York Philanthropic League of the United Order of True Sisters for his "outstanding and untiring efforts through his public offices to aid many orthopedically handicapped people become productive members of the community."

WILLIAM C. GITTINGER, M.D., formerly in the Clinical Research Department, has been named medical director, Pfizer Laboratories, Division of Chas. Pfizer and Co., chemical and pharmaceutical firm, Brooklyn, N. Y.

NEIL S. GORDON, M.D., D.P.H.,* former Harford County (Md.) health officer, is now health commissioner, Chemung County, Hornell, N. Y.

HAROLD R. HARLAN, D.D.S.,* staff member, Martland Medical Center and St. James Hospital, Newark, N. J., and assistant dental supervisor, Newark Department of Health, is the new president, Essex County Dental Society.

CAROLYN HAYS, former teacher of partially-seeing children in South Bend, Ind., is now program consultant, National Society for the Prevention of Blindness.

MARION L. HENRY,† former director, Office of Business Administration, has been appointed assistant commissioner for administration and management, New York State Health Department.

IRA V. HISCOCK, SC.D.,* chairman, Yale University Department of Public Health, has been elected president, National Society for the Prevention of Blindness.

RITA F. HUENER, R.N.,† regional director, public health nursing, Albany Regional Office, New York State Department of Health, has retired.

ROBERT H. KING,† former head, Agricultural Chemistry Department, University of Wyoming, is now a civilian scientist, U. S. Army Chemical Corps Proving Ground, Dugway, Utah.

STANLEY H. KING, PH.D.,† former research associate in public health practice, University of Pittsburgh, is now associate director of research, University Health Services, Harvard University.

HARLEN W. KINGSBURY,† chief sanitary officer, Newton (Mass.) Health Department, has received the 1958 Walter S. Mangold Award, highest honor of the National Association of Sanitarians.

K. L. KOLLAR,† sanitary engineer consultant, International Cooperation Administration, Venezuela, received the Allied Chemical Award for most outstanding contribution to international health presented at the Congress for his paper, "Standards for Design and Construction of Rural Water Supplies," prepared with his collaborator, G. RIVAS M., and read at the recent Sixth Congress of the Inter-American Association of Sanitary Engineers.

ROBERT F. LEWIS, M.P.H., PH.D.,† is assistant professor of biostatistics, Department of Tropical Medicine and Public Health, Tulane University School of Medicine.

J. M. MACKINTOSH, M.D.,* formerly on the staff of the London School of Tropical Medicine and Hygiene, is presently director, Division of Education and Training Services, WHO, Geneva.

JOHN B. MACMURDO, former field director,

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* Fellow.
† Member.

National Multiple Sclerosis Society, is now director of national program support, National Society for the Prevention of Blindness.

JAMES F. MADDUX, M.D.,* former chief, Mental Health Services, Chicago Regional Office, Public Health Service, is now deputy medical officer in charge, Public Health Service Hospital, Lexington, Ky.

PETER S. MARRA,† in charge of the Mineola, Nassau office of Nussbaumer, Clarke, and Velzy, designers of sanitary sewer projects, has been named an associate of the firm.

HENRY E. MELENEY, M.D.,* emeritus professor of preventive medicine, New York University, and research professor of medicine, Louisiana State University, has retired from the latter position to become assistant health officer, Alachua County, Gainesville, Fla., with special responsibility for the development of research and personnel training programs.

MARY B. H. MICHAL, M.D., M.P.H.,† health officer of Alleghany, Ashe, and Watauga Counties, N. C., was honored on Doctor's Day, March 30, by the city government of West Jefferson for rendering outstanding service in the field of public health.

JOSEPH G. MOLNER, M.D.,* health commissioner, Detroit, Mich, has been appointed health director also for Wayne County in which the city is located. At present he will act in separate capacities in the two jobs, but the appointment is considered the first step toward ultimate merger of the two Health Departments.

F. RANDOLF PHILBROOK, M.D.,* former associate, Department of Epidemiology, Harvard School of Public Health, is now assistant director, Division of Communicable Diseases, Massachusetts Department of Health.

WALTER F. PRETORIUS, JR., M.D., has been loaned for two years by the Public Health Service to the North Dakota State Department of Health as director, Division of Preventable Diseases.

JULIUS S. PRINCE, M.D.,* health officer, Jamestown District Office, New York State Health Department, is on a two-year leave as chief, Health Division, International Cooperation Administration, Ethiopia.

WALTER B. QUISENBERRY, M.D., M.P.H.,* former executive director, Hawaii Cancer Society, is now director, Division of Preventive Medicine, Hawaii Territorial Health Department.

JAMES G. RONEY, JR., M.D., M.P.H.,* former communicable disease control officer and maternal and child health officer, San Mateo County (Calif.) Department of Public Health and Welfare, is now director, Butler (Pa.) County Health Department.

NORMAN J. RUBIN, former assistant director, Yale University News Bureau, has been appointed director of public relations, New York Tuberculosis and Health Association, New York, N. Y.

ALICE STARR, R.N., former associate professor, public health nursing, School of Nursing, University of Texas, is now on the staff, Public Health Nursing Service, St. Louis Division of Health.

A. H. TRITHART, D.D.S.,* former regional dental officer in west Tennessee, Division of Dental Health, Tennessee Department of Public Health, is now director, Division of Dental Health, Montana State Board of Health.

BORIS A. VANADZIN, M.D., public health physician, Pittsfield District, Massachusetts State Health Department, has resigned to continue his studies at California School of Public Health, Berkeley, under a one-year Public Health Service traineeship.

LEO WADE, M.D.,* associate clinical professor of industrial medicine, New York University Postgraduate Medical School, and medical director, Esso Standard Oil Company, is chairman, Organizing Committee for the 13th International Congress on Occupational Health, to be held in New York City in 1960.

GLADYS JACOBY WILSON, R.N.,† is director, public health nursing, New Rochelle (N.Y.) Health Department.

ANNETTA CORNELL WOOD, former director, fund raising and public relations, United Neighborhood Houses of New York, has succeeded MARY HASKELL, resigned, as executive director, American Physical Therapy Association. MISS HASKELL is moving to California with her mother.

WILLIAM P. YANT, M.D.,* director of research and development, Mine Safety Appliances Company, has received the 18th Annual Arthur Williams Medal of the American Museum of Safety for "outstanding contribution to the conservation of human life."

DEATHS

WILLIAM C. CHAPLIN,† veterinary bacteriologist, Western Washington Experiment Station, State College of Washington, Pullman, on August 21 (Engineering and Sanitation Section).

TIM GREEN,* sanitarian, Oklahoma City-County Health Department, July 1 (Engineering and Sanitation Section).

* Fellow.
† Member.

L. L. HEDGEPETH,* of the American Cyanamid Company, New York, N. Y. (Engineering and Sanitation Section).

FRANCIS J. LEAHY, M.D.,† of Chicago Heights, Ill. (Medical Care Section).

BARBARA P. H. LEAVELL,† Cambridge, Mass., in early 1958 (Public Health Education Section).

ELLEN C. POTTER, M.D.,* director of medicine, Division of Medicine and Inspection, New Jersey Department of Institutions and Agencies, New Jersey State Department of Health, on February 10 (Medical Care Section).

CONFERENCES AND DATES

State and Regional Public Health Meetings:

California, Southern, Public Health Association. Huntington-Sheraton Hotel, Pasadena. December 5.

Connecticut Public Health Association. Newington Home and Hospital for Crippled Children. Newington, Conn. November 13.

Massachusetts Public Health Association. Massachusetts Institute of Technology, Boston. January 29.

Oregon Public Health Association. Multnomah County Health Department. November 6–7.

Meetings of Other Organizations Coming in November and December, and January, 1959:

American Dental Association. Dallas, Tex. November 10–13.

American Society of Tropical Medicine and Hygiene. Deauville Hotel, Miami Beach, Fla. November 5–8.

Cuban National Dental Congress (Fifth). Havana, Cuba. November 14–17.

International Conference of Social Work (Ninth). Tokyo, Japan. November 30–December 6.

International Congress of Leprology (Seventh). Sankei Kaikan Building, Tokyo, Japan. November 12–19.

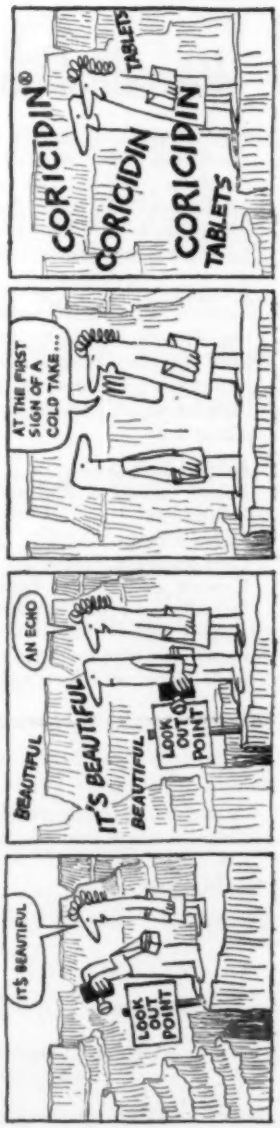
National Association for Mental Health. Kansas City, Mo. November 19–22.

National Conference on Air Pollution, called by the Surgeon General, Public Health Service. Sheraton-Park Hotel, Washington, D. C. November 18–20.

National Society for Crippled Children and Adults. Statler Hilton Hotel, Dallas, Tex. November 16–20.

National Social Welfare Assembly. New York, N. Y. December 9–11.

* Fellow.
† Member.



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Public health laboratory personnel now have an up to date, authoritative manual in *Recommended Methods for the Microbiological Examination of Foods* to guide them in routine and special examinations of foods and food products. Each chapter has been prepared by experts and reviewed by others. The methods have also stood the critical examination of leading public health laboratory directors.

Starting with methods developed by committees of the Food and Nutrition Section, the volume has been prepared by the Subcommittee on Methods for the Microbiological Examination of Foods. Harry E. Goresline, Ph.D., has been chairman of the Subcommittee and served as editor of the volume. The report has been approved for publication by the Committee on Evaluation and Standards. Each chapter considers methods for related food products. These are:

Bottled Soft Drinks
Brined Salted & Pickled Vegetable Products
Canned Foods
Carbohydrate Products
Cereals and Cereal Products
Dehydrated Fruits & Vegetables
Eggs & Egg Products
Fermented Foods
Fruit Juices and Concentrates
Frozen Fruits, Vegetables & Precooked Frozen Foods
Mayonnaise, Salad & French Dressings
Meat and Meat Products
Poultry Meat
Spices
Sanitation Indexes
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A preface has been written by Ferdinand R. Hassler, M.D., Chairman of the Coordinating Committee on Laboratory Methods.

212 pages $4.50

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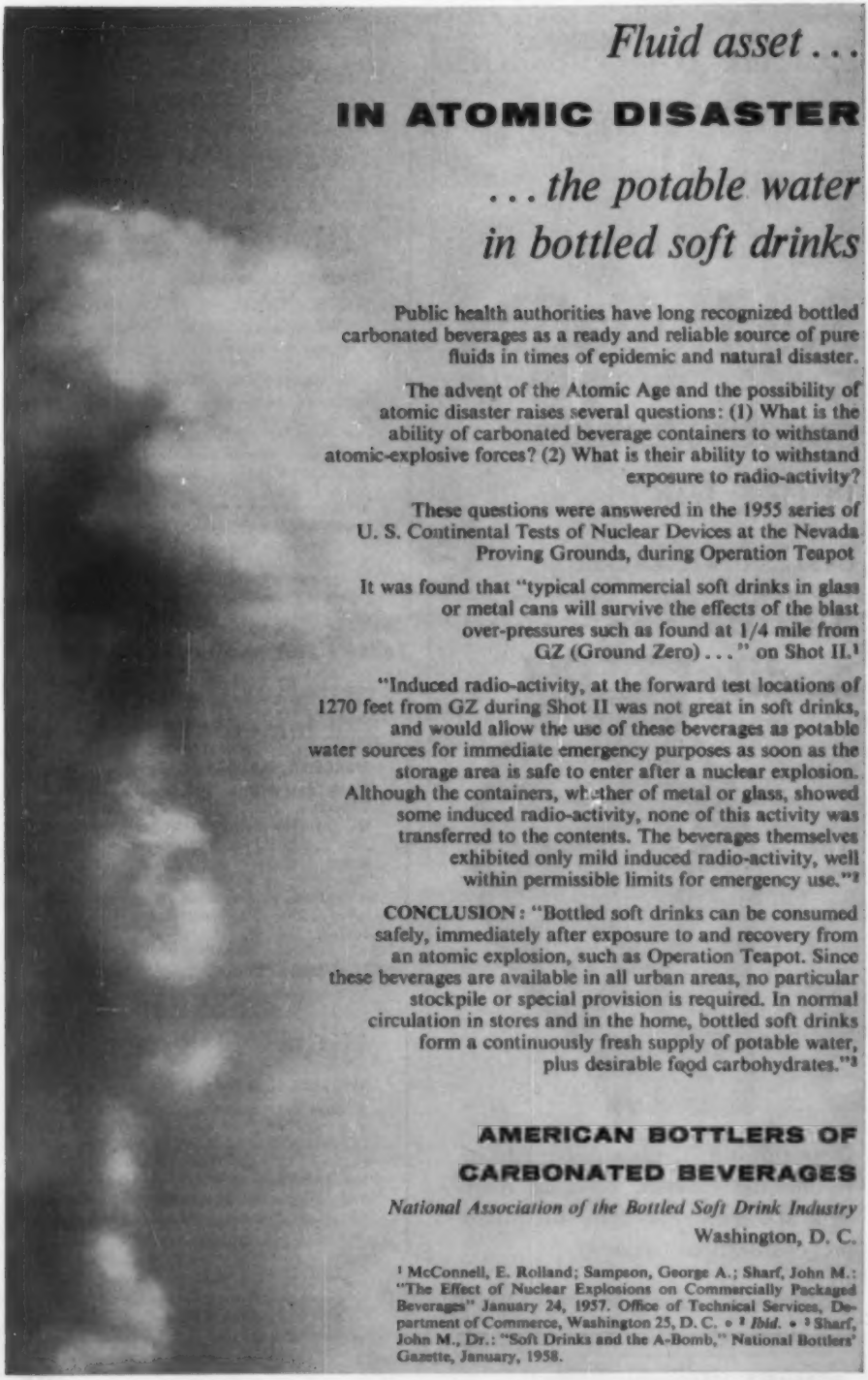

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[1] McConnell, E. Rolland; Sampson, George A.; Sharf, John M.: "The Effect of Nuclear Explosions on Commercially Packaged Beverages" January 24, 1957. Office of Technical Services, Department of Commerce, Washington 25, D. C. • [2] *Ibid.* • [3] Sharf, John M., Dr.: "Soft Drinks and the A-Bomb," National Bottlers' Gazette, January, 1958.

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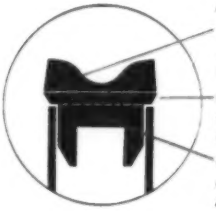

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